

HANDBOOK OF THE RIFLE FOR USE IN SCHOOLS

Training and Care of Arms
for .303 and .22 Rifles

by

CAPTAIN L. R. GODFREY
(Denstone College O.T.C.)

Foreword by

COMMANDER SIR LIONEL FLETCHER
C.B.E., R.N.R.

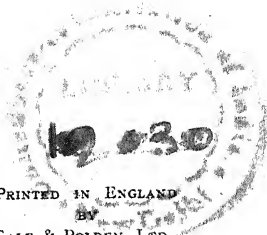
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ACKNOWLEDGMENT

For many years I have felt the need of some handbook to assist those who undertake the training of school shooting teams, and one which will also be of service and interest to members of the team themselves. No such book seems to be forthcoming and after some hesitation I have ventured to tackle the task myself. For encouragement in this I am indebted to Major S. O. Jones of S.D.3b. of the War Office.

I do not claim that there is anything particularly original in any part of this small textbook—it is largely what is common knowledge to experienced riflemen, adapted after some ten years' experience of training school teams at home and abroad, to meet the requirements of schools.

I am deeply indebted to Viscount Bridgeman of the War Office Staff, who has read the typescript and had it carefully examined by experts of the Small Arms Department. To him and them I am also grateful for several useful suggestions which have been incorporated in the text.

I should like to take this opportunity of thanking Captain J. S. Sedgewick, M.C., who has at all times been most helpful to me in shooting matters, and has on this occasion offered most valuable criticism and advice.

Finally, I wish to thank Commander Sir Lionel Fletcher, C.B.E., R.N.R., who has always taken the keenest interest in schools' shooting, for kindly writing a foreword.

L. R. GODFREY.

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A FOREWORD

by

COMMANDER SIR LIONEL FLETCHER,
C.B.E., R.N.R.

Rifle shooting is a most important phase in our national defence, and at the same time an extremely fascinating sport.

One of our most distinguished sailors once said that rifle shooting, in particular miniature shooting, was the basis of all gunnery, afloat or ashore ; in fact, it was the cradle of the whole business.

A relative who was Captain of the " top ship " for gunnery in the Royal Navy told me that he never appointed gunlayers or sightsetters till they had been through an intensive course of .22 shooting, and had become thoroughly rifle minded.

Speaking at the prize distribution at Bisley in 1933, Lord Hailsham, in his capacity of Secretary of State for War, said that whilst it was true that automatic and machine guns played a big part—more than was the case

nineteen years ago—he at least most firmly believed that the day of rifles was by no means over.

He went on to say that the rifle is permanently a personal weapon, which taught a man confidence in himself, in his power and in his capacity.

In writing "Handbook of the Rifle for use in Schools" Captain Godfrey is to be congratulated in having achieved a style which should captivate the attention of all boys, because he has put his material together in a form which is not too technical in character, yet at the same time brings out all essentials.

PART I—MINIATURE

CHAPTER I

INTRODUCTION

WHAT is the use of rifle shooting and why do we shoot ? We find this question as difficult to answer as does the cricketer or golfer, neither of whom plays for the utility of the game, for its usefulness is no criterion and may even be non-existent. There may be usefulness in shooting and not in golf, as it produces the man skilled in the use of a lethal weapon. But which one of us ever for one moment thinks of killing or of war when occupied in his favourite pastime

Admittedly there may be more exercise in golf than in shooting, but most men do not play golf because of the exercise entailed. The critic who talks of rifle shooting as merely lying down and firing a number of shots at a target will describe golf as just hitting a small ball about with a stick. Both these sports call for intense training from their devotees, the will to practise, to learn to overcome difficulties, to develop control of self, to produce close co-ordination between eye, brain and muscles—all, in other words, that we could describe as skill. For target shooting, as we know it, is a sport and a pastime, and this for most of us is sufficient excuse for its existence and our enthusiasm.

We speak of the build of an athlete and suggest thereby

that some of us are born with certain characteristics of body which will aid us with training to surpass all rivals in sprinting and hurdling. Is this equally true of shooting? Is one boy born with a special aptitude for the game? We hear so much about the "keen-eyed" marksman that we begin to think there is.

But the man with the keen eye who is supposed to see so much more clearly than us poor mortals is a myth. Admittedly some have much better sight than others, but the boy with reasonably good sight can become a King's Prize winner. He may wear glasses, though they are a great nuisance on a wet day, and as long as he has not defective eyesight he can train himself to be a useful shot. Most of the "keen eye" is training and experience.

And as to physique, there is no necessity for large muscles or great strength. The unanswerable proof of this is that in 1930 a lady, Miss M. Foster, won the King's Prize, the most keenly contested of all individual sporting events. All that is needed is good health, average physique, and mental ability; I include the latter as the man who cannot concentrate on the job in hand, or control himself when a big test comes, will never really succeed at the game.

To shoot well, one must have perfect co-ordination between all parts of the body—mind, muscle and eye. Such co-ordination comes easily to the boy who is "good at games"; that is, there are some who have a natural talent for such things and come to the fore with very little training. The majority of us have no such special talent, but we can train ourselves to become reasonably proficient. Some of the best marksmen have had no special physical qualities, but with the will and fixed determination to get there have drilled

themselves into the ability to compete with those of natural ability on equal terms. Perhaps "equal terms" is underestimating the extent of their eventual progress, for the man with the natural "flair" for sport sometimes lacks the power of intense concentration which is necessary when the test of the big match comes along.

In the majority of schools in the summer cricket is given preference before shooting, and one hears a wail from the sergeant instructor who has taken class-firing that his best shots will play cricket next term and not be available for the VIII. But does this matter? All that has happened is that one or two of those who have a special flair for games and show a like aptitude for shooting are lost to us. But there are many others whose physique does not bespeak the first-class cricketer, who yet possess those mental qualities which denote the latent ability to shoot and shoot well. And then there are the rest of us who are keen to shoot and are determined to shoot well. Here surely is as good material as any school could desire.

Shooting in schools is mainly of two types. Where there is an Officers Training Corps every boy in the corps is expected to fire the Empire Test or some other form of class-firing each year, and where there is no military formation the shooting is carried on by a club within the school. A very large number of schools are of the former type, and for them the majority of competitions are arranged; at the present they form 100 per cent. of the schools who fire on the open range, but technically there is no reason why a rifle club in any other school affiliated to the National Rifle Association should not fire .303 if it can fix up range accommodation.

Let us therefore view the shooting of these two types. In the school with the big O.T.C. there is a tendency to leave all the elementary instruction in the hands of the Permanent Staff Instructor. That they are very capable hands I do not question, but one must realize the difficulty of the instructor who, year in, year out, has to teach anything from one to five hundred boys, according to the size of the contingent, about one-third of whom are recruits, the rudiments of shooting in the weekly parades or in the boys' spare time, when they are put through in the odd half-hour that they are not wanted for the hundred and one other school activities.

The instructor's work is monotonous and difficult, and it says much for their enthusiasm that they produce the excellent standard one meets in so many schools. In addition, the admirable standard of rifle shooting produced in the Ashburton and other cadets' competitions is largely their work.

But this is merely the routine work of the O.T.C., and there is little scope for the boy who is keen on shooting, as he possibly shoots only four or five times in a year.

Some system is needed to search out the boy who will become a good shot and to give him ample practice. The best arrangement will be one that finds him whilst he is still a recruit and can fire several years for the school. I know that many schools have very efficient arrangements of their own by which they not only cover the class-firing programme, but also bring the embryo marksman to the fore; I merely wish to suggest that there is excellent material that is often never discovered.

In some of the schools' competitions—*e.g.*, the "Country Life" on the miniature range and the

Ashburton on the open—the scores of some of the bottom teams are so dreadful that the best marksmen cannot have been found, or, if they have, can never have received sound instruction. Very rarely is there a boy who does not want to shoot. They all start with great enthusiasm, but if they are badly instructed and their scores are correspondingly bad and they make little progress, they will soon conclude that they will never be good at the game. In nine cases out of ten this will be quite untrue.

Most schools have their own systems, many of them probably much better than the one I suggest, but I have seen this working efficiently in two schools and describe it for what it is worth.

Each House or House platoon is allotted a fortnight or more, according to its size and numbers, for practice. At the end of that time the actual Empire Test is fired, and 50 per cent. of the total strength of the House or House platoon forms its team. If the Imperial Challenge Shield Competition course is substituted for the Empire Test—and this is permitted by the War Office—the same system can be carried out, and the school can at the same time compete for His Majesty the King's Trophy.

If a House shooting trophy is awarded on the results of this competition, keenness is greatly stimulated, for every boy in the House has a chance of being included in the best 50 per cent. which constitutes the team. The sergeant-instructor finds his pupils much keener to learn to shoot, and senior N.C.Os. and marksmen in each House or platoon will make it their business to coach and endeavour to extract good shooting from the newest of recruits. This system has a great advantage over that which makes the team for the House trophy six or eight firers, as it becomes impossible for a House with only a

few good shots to win. There must be a good all-round standard, and a small House is also on equal terms with the larger Houses.

I have dealt more fully with this method of firing under the section which describes the Imperial Challenge Shields Competition.

Shooting can become an expensive item for the O.T.C., but when the general instruction of the unit has been accommodated, the formation of a small club often proves a workable proposition. If, for example, spoon competitions are held on the Society of Miniature Clubs' O.T.C. decimal targets, and each firer is charged sixpence entry fee, a weekly competition for a silver spoon or medal can be made to pay for itself, and twenty or thirty firers will get extra shooting practice. (When .22 ammunition is bought from the I.C.I., excellent souvenir silver spoons are presented by the manufacturers for competition on the scale of one per 2,000 rounds.)

Many schools with no military formation include miniature rifle shooting amongst their sporting activities. Though they cannot take part in O.T.C. Competitions, there are yet many other events open to them, some of which I have mentioned in the chapter on the use of the target rifle. Nor is this confined to boys' schools. Downe House School, for instance, has more than once won a miniature competition when all the other competitors have been boys.

For those schools where target shooting is an accepted activity, there is nothing to add. I have, however, appended a few remarks for those where, as yet, there is no form of the sport at all.

Where there is no O.T.C. or Cadet Corps, the first and greatest problem is that of obtaining a miniature range.

There are many regulations and restrictions about these, but they are easily surmounted, and the S.M.R.C. of Codrington House, 23, Water Lane, Ludgate, E.C.4, publishes a small manual on the subject in which excellent suggestions for building and fitting up a range are made. It is not for me here to give any advice on this matter, except that a letter to the secretary of the S.M.R.C. from those wishing to form a rifle club is sure to receive sympathetic attention. Suffice it to say that many preparatory schools have built miniature ranges for themselves at very little expense. As an alternative, the loan or hire of a local club or Territorial range may be possible.

The next expense is that of providing rifles. To start with, three or four target rifles are required. Good "Parker-rifled" second-hand ones can be bought at a very reasonable price, and in my opinion they are quite as accurate as new ones. If those who are to fire vary greatly in age and size, a couple of lighter rifles would be advisable. In any case Rome was not built in a day, and the "armoury" can be gradually increased.

Shooting is best administered by the formation of a school club, preferably under the supervision of some master who is an enthusiastic marksman, and should at once become affiliated to the S.M.R.C. or N.R.A. This will obviate many difficulties with the acquiring of firearms, for which a police firearm certificate is necessary.

CHAPTER II

ELEMENTARY TRAINING ON THE MINIATURE RANGE

THE finest school of target shooting is the miniature range. Here at comparatively small expense one can practise and experiment. The more serious minded who are determined to succeed in this sport can, at a small cost in cash and time, find the cause and remedy for any faults that may consistently appear in successive shoots. It is a fascinating pastime, and many are satisfied to shoot on the miniature range alone. Some of the finest open range marksmen in the country will tell you that they learnt to shoot in this way, and, except for a lucky few who live near Bisley, through the winter months there is no other form of the sport. On a winter's day on a covered range one can steady oneself down after a busy summer on the open range, and learn again to "hold" a rifle in a form of the sport which for sheer accuracy and steadiness is much more exacting than the larger bore.

I do not at this stage intend to compare the merits of open and aperture sight shooting, but as the majority of boys at public schools learn to shoot through the medium of open sights and the .22 S.M.L.E. in class-firing in the O.T.C., I shall deal with that form first and the use of aperture sights and the target rifle afterwards.

1. The S.M.L.E. with Open Sights.

(a) Position.

I assume that anyone who is sufficiently interested in rifle shooting to read this will at least have handled and fired a rifle of some kind. The majority will have fired the Empire Test or some other form of class-firing on the miniature range with the .22 S.M.L.E. I shall thus first of all deal briefly with the position for firing this rifle without using a sling.

The military instructor advocates that the body should be inclined to the line of fire some 30-40 degrees. He has to bear in mind that the firer must offer as small a target to the enemy as possible. From the point of view of the target marksman, there are several advantages to be obtained from increasing this angle to 45-50 degrees, with the legs splayed as wide as comfort will allow, so that the whole of the lower body seems to hug the ground. The left elbow is placed a little farther outwards to the left than is usually the case in army training, and the right elbow will naturally move out slightly to the right also.

The conventional higher position always seems stilted and something of a strain, and there seems to be some effort needed to lift the breast and shoulders up to the rifle. With the wider and lower position more of the body hugs the ground and the feeling of strain is absent; even without a sling one seems to be able to rest against the rifle. Rifle and marksman feel as one.

There are two other points to mention in connection with the lower position. First, the left hand travels along the fore-end farther from the magazine and thus gives a steadier hold. (This is a particular advantage to

recruits and boys of "cadet pair" age, where the firer is sometimes very small indeed and the weight of the rifle becomes an important factor.) Secondly, the butt position on the right shoulder is improved, as the point of the shoulder comes forward, making a bed for the butt. If a rifle butt is a short one—they are made in three sizes, short, medium and long—the head is sometimes brought too near the backsight; this can be remedied on the full bore by changing to a medium or long butt.

On the crowded firing-points that are frequently met both on miniature and open ranges, especially during the Imperial Meeting at Bisley, the wide splaying of the legs may be a nuisance to one's fellow-firers. In such circumstances take the same low position and wide angle of the body, but cross the left leg over the right. Although the body does not seem to hug the ground in quite the same way, this is better than having to change the holding position to which one has grown accustomed.

The left elbow is the important one since it should not be moved as all other movements pivot on it. The right elbow should be moved as little as necessary, and in miniature shooting need not be moved at all if the ammunition block is placed conveniently to hand.

There should be no strain at all in the position. To test this, come into the aim, close both eyes, and wriggle until you feel completely comfortable. Open your eyes. Now you will probably find that the rifle is sighted either too low or too high. Keep your elbows in the same position and, if the sighting is too low, move the body back a little; if too high, move it forward. This will give you an unstrained position for elevation. If there is any lateral error the whole elbow position must be changed.

(b) Holding.

After acquiring a correct body position, the learner must next check his holding of the rifle.

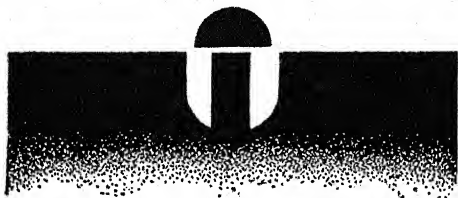
Left hand.—We have seen with the lower body position the left hand moves some way forward from the magazine. Keep the wrist below the fore-end; the left thumb can get a good position on the left backsight protector (this helps to check canting), and the fingers slope backwards on the right side of the fore-end and are thus clear of the line of sight. The chief task of the left hand and arm, therefore, is to hold the rifle upright and form a prop for its weight. (Care should be taken that the thumb or fingers do not rest on the sight itself, as the slide may accidentally be moved and a bad shot, high or low, or even a miss, may result.)

Right hand.—Grip the "small" of the butt firmly with the thumb and fingers—except the first or trigger finger—of the right hand, the thumb above and the fingers below the "small." The hand should be well forward so that the trigger finger can curl right round the trigger, with the **second** joint low down in the curve of the trigger.

Finally the right cheek pressed firmly on the top of the butt in such a position that the right eye can conveniently see over the aligned sights. Personally I check my head and right hand positions by always getting the same point of contact of the knuckle of my right thumb and cheek. One word of warning is necessary here, as on the open range the thumb nail can cut the cheek or upper lip unpleasantly when the rifle is fired. In any case, it is a wise precaution to keep the nails short.

(c) **Aiming.**

The S.M.L.E. sights consist of a U backsight and a blade foresight. The firer is told by the drill book to get the firesight in the centre of the U of the backsight and level with the shoulders of the backsight. The foresight thus aligned is placed at the lowest central point of the aiming mark or target to be hit.



NORMAL CORRECT SIGHTING.

This aim needs little comment, except that it is better to leave a fine line of space between the foresight and the aiming mark, in order to avoid the sight slightly covering the mark without being noticed.

For almost all S.M.L.E. shooting with open sights, either on the miniature or open range, the aiming mark is the black half circle of the "Tin Hat" target, and this gives a clearly defined line at which to aim.

If the marksman could thus align his sights every time and his position and let off were good, there is no reason, on a miniature range, or even on the open range if wind is discounted, why he should not score a bull every time he fires.

Unfortunately, it is impossible to see the foresight, backsight and aiming mark sufficiently clearly at one and the same time to get the required picture.

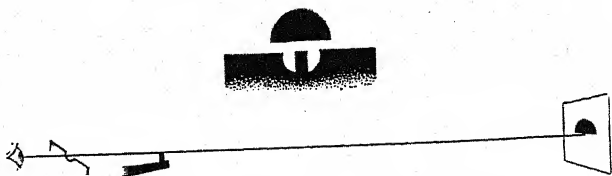
The eye cannot simultaneously focus objects which are eight inches, three feet and, say, two hundred yards or more away. It can only really focus one of them. Thus the question arises, which should be focused, the backsight, the foresight or the target?

The foresight has been placed on the farthest point of the rifle from the eye—*i.e.*, the muzzle—and the backsight must be a fair distance from it so that a sufficiently long sight base may be obtained for accurate aiming; the nearer the sights, the less the accuracy. On the other hand, the backsight must not be too near the eye: the farther from the eye, the easier it is to align the sights correctly.

It is generally accepted that it is useless to focus the backsight. Try it and see what impression you get of the foresight and target; they become little more than a blurred background to the focused backsight.

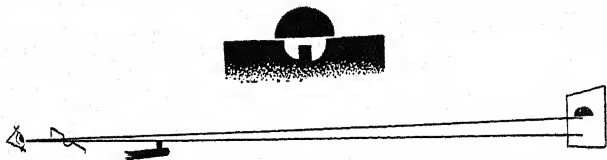
If, on the other hand, the target or aiming mark is focused, the rifle sights tend to blur. An indistinct or lost foresight usually produces a hopelessly low or high shot. When any inaccuracy in elevation of the rifle sights is multiplied by the distance from the target, some idea of the size of the error is given.

Thus at all costs the sights must be correctly aligned, and this is best done by focusing the foresight and getting a correct picture of it, central in the U and aligned with the shoulders of the backsight. The aiming mark may become somewhat blurred, but that is of secondary importance, for if the marksman manages to see the



CORRECT AIM WITH MORE THAN NORMAL WHITE
BELOW MARK.

same picture of the aiming mark or target behind correctly aligned sights, there will be little error on the target. The shot will strike the target where the sights are directed, a small error compared with that shown in the following diagram.



INCORRECT AIM WITH FORESIGHT TOO LOW IN U.

I have fired with open sights at 600 yards in a mist at Bisley, when it has hardly been possible to see the target at all. The best I could see over my sights was a blur that was the six-foot target. I decided what was the best "picture" I could get behind my sights, changed elevation on a high sighting shot, and was rewarded by a string of bulls. (A magpie followed these, but that was due to carelessness.)

Other common errors in sighting are, firstly, the foresight not central in the U—this will produce a left or right shot; and, secondly, a cant of the rifle from the vertical, which also gives a left or right shot, the round moving in the direction of the cant. It is difficult to cant much without the fact being obvious to the firer in the picture he gets over his sights. Sometimes the foresight is a little bent from the vertical; this tends to upset a shoot, and the rifle should be taken to the armourer, who can easily fit a new foresight.

(d) Let-off.

After learning the correct body position, hold and aim, it now remains to let off or fire the round; that means the trigger has to be pressed to release the striker in such a way that no other part of the rifle is moved.

The first movement that must be checked is that due to breathing. If the firer continues to breathe, his shoulders will be raised and lowered with each successive breath, and the muzzle of the rifle will rise and fall accordingly.

If the lungs are emptied or completely filled, holding the breath soon becomes a strain. The lungs are therefore half-filled, and no feeling of strain is experienced for some time. In deliberate shooting, when the firer is unsteady or is feeling the strain of a round that "would not go off" properly, a good way of steadying oneself is to breathe easily two or three times and then restrain the breathing as recommended before.

After a little practise, breathing control becomes automatic and is done unconsciously.

Captain J. A. Barlow, in his book, "The Elements of Rifle Shooting," stresses the fact that hold and position

are the important factors and correct trigger pressing is secondary to this. He points out that many riflemen put the cart before the horse and attempt to correct the effect of bad holding by super trigger squeezing.

This concentration on holding in place of trigger pressing is doubtless a very sound principle, and has proved its worth in the personal successes of Captain Barlow.

Unfortunately, most boys have neither the physique of Captain Barlow nor the time to undergo the intensive training necessary to produce such vice-like holding. In most of school shooting, the limited stature and physique of the firer has to be counteracted by the use of a sling and by an extremely smooth and deliberate let-off.

The firer keeps as steady a position as he can get without strain, but for the majority any vigorous movement of the trigger finger will upset this rather precarious stability.

Thus for smaller boys and the average boy a smooth and steady squeeze must be acquired.

I have heard it said that this squeeze must be so steady and deliberate that the marksman hardly knows when the actual explosion of the round will take place. This, I think, should not be the case, for the perfect aim is not there the whole time, but the sight moves to and from the correct picture, no matter how slightly. Thus the firer must be able to take the majority of the second pressure and know the exact correct instant when the round will be released. This will only be achieved by constant aiming practice.

Normally a pull of between five and six pounds is necessary to release the striker of the S.M.L.E. In order

to overcome the difficulty of holding the rifle whilst this is done, the pull is divided into two pressures. If a weight of three or four pounds is applied to the trigger, it moves some short distance and then checks; a further weight of an additional two pounds, making five to six pounds in all, is necessary to release the sear from the bent and let the striker fly forward. Thus if the three to four pound pressure is carefully taken as the rifle is first brought into the aim, there is less likelihood of it moving when the second pressure of about an additional two pounds is taken.

As the rifle is pulled firmly into the right shoulder by the right hand, carefully and firmly take the first pressure. With practice the sights can be quickly aligned and the correct aim taken before there is any serious physical strain—*i.e.*, before either hand or eye tires. There must be no delay between seeing the correct picture and taking the second pressure. After practice one follows the other automatically.

Error creeps in as soon as the picture has not quite satisfied the marksman and he has delayed on the aim, tiring the eye and arm, and eventually pulling or snatching at the trigger when the aim is probably no longer correct and the firm hold has become unsteady through effort.

In deliberate firing there is only one thing to do in such circumstances: come down from the aim, relax half a minute, and begin again. In rapid practices there is no time for this delay, and the firer is well advised to let off a reasonably good shot whilst the hold is good. It should never be far out of the bull. In any case, I am convinced that the first picture one has of the sights and aim correctly aligned is the best one; the eye is

untired and sees clearly—thus the self-training necessary to make a steady trigger pressure automatically follows without delay and before the "clear view" is lost.

Practice makes perfect, and the combination of holding, aiming, and trigger pressing can be practised day by day in the drill hall or any suitable room by anyone who is anxious to excel. Put a target as far away as space allows, lie down on a piece of matting, and drill yourself in this until you are completely familiar with the combined processes of holding, aiming and trigger pressing. Only by practice can a steady let-off immediately follow the eye's registration of the correct picture.

You will notice that the above advocates fairly quick shooting, but remember that although there is no advantage and every disadvantage to be had from dwelling on the aim once the correct picture has been seen, yet there is never any excuse for a careless shot—especially in deliberate shooting. In most forms of sport it is possible to get away with carelessness, but such is never the case with target shooting. It is never any use letting a shot go when you are uncertain of aim, or feeling the strain of holding. A bad hold, a bad aim, or a bad and delayed let-off invariably produce a bad scoring shot.

Though most miniature shooting in clubs is done with target rifles and aperture sights, he who has struggled with and mastered the .22 S.M.L.E. starts his career on the open range with a rifle he is used to handling, and he is thus prepared for shooting in service rifle competitions where open sights are used.

To adjust sights and zero the rifle.

The leaf of the backsight is graduated in hundreds of yards on the right side and subdivisions of 25 yards

each on the left. Lesser adjustments than 50 yards can be made by means of the fine adjustment worm wheel. This has ten thumb-nail divisions, so that the rotation of one of these will give a range increase of one-tenth of 50 yards—that is 5 yards. If the line on the slide does not exactly coincide with the required graduation on the leaf, press the stud on the slide slightly with the left thumb so that the worm wheel may just be rotated by the thumb or finger-nail until the lines do coincide. Do not press too hard on the stud or the worm will not engage the thread on the side of the leaf. Make sure that the stud, when you release it, locks the slide in the correct position.

After you have fired a group and wish to apply it to the bull, the sights must be raised or lowered. Bear in mind that the rise in the sights from 400 to 500 yards produces a greater rise than, say, 200 to 300 yards; this is because of the increased steepness of the ramps for the higher elevations.

Although the elevation you will use on your rifle will probably be from 200 to 300 for 25 yards range, the following rough table may be of value to some.

<i>Range</i>	<i>Increased to</i>	<i>Rise at 25 yards.</i>
200	300	1 in.
300	400	1 $\frac{1}{8}$ in.
400	500	1 $\frac{1}{4}$ in.
500	600	1 $\frac{3}{4}$ in.

If your grouping is left or right and the other users of the rifle find the same thing, it should be zeroed.

This is quite simply done on the 25 yards range. Take an ordinary class-firing target and draw a vertical

line right through the centre of the aiming mark to the top and bottom of the target. Use a sand-bag or bag filled with straw to support the left hand in position and thus obtain increased steadiness. (Do not support the rifle itself on the rest or you will find that it does not help at all, as your position and hold are unnatural.) Fire a very careful group. If the centre of this is off the line to left or right, the armourer or the R.S.M. will move the foresight over for you.

Although some .22 S.M.L.Es. have a windgauge, this is best ignored and left central, the rifle being zeroed as above.

(f) The .22 S.M.L.E. with Sling.

The use of a sling is allowed in class-firing for O.T.Cs. if the Imperial Challenge Shields course is fired in place of the Empire Test. It is also permissible in the Society of Miniature Rifle Clubs' competition for O.T.Cs. which is fired every November.

When correctly used it is a great advantage to the firer, especially to recruits and smaller boys. At first, however, it seems more of a hindrance than a help; it is always slipping and seems to be for ever nearer the elbow than the armpit, although the firer complains that it is much too tight. I am nearly six foot three in height, but the small recruit's sling, when adjusted to his liking, is usually big enough for me.

As with all else in rifle shooting, the firer must practise the sling position until he finds the length of sling that suits him best. He will probably tighten it again later.

The rifle as issued has a butt swivel, but no swivel by the magazine. The butt swivel is transferred to in front of the magazine, care being taken to put it on with



PRONE POSITION WITH SLING. I.

Note the wide position of the elbows, with left hand well forward from magazine.



PRONE POSITION WITH SLING. II.

Note the wide and low elbow positions, wide angled splay of the body, and sling well up under the left armpit.

the longer loop to the left, otherwise the sling will pull more strongly on the right and cause a tendency to cant.

The service webbing sling is not very suitable for the purpose as it is rather narrow, clumsy to adjust, and is made primarily for carrying the rifle. Either thin leather slings, simply fastened by a leather lace and button and adjusted by a buckle, or special thin webbing slings can be bought cheaply from any of the big armourers.

How to use the sling.

The following is a simple way to get into the sling.

Rest the right elbow on the ground, holding the rifle clear so that the sling hangs in a loop.

Place the left arm in the loop and swing the rifle to the left so that the sling travels up to the left armpit. As soon as it is there, move the rifle over to the right so that the sling stays in position and does not slip down the arm.

Bring the left hand under the sling and round to the left to grasp the fore-end above the sling near the lower band.

Place the left elbow in position on the ground. The left hand may now relax somewhat so that it forms a rest, the thumb and fingers checking any tendency to cant.

The butt is placed in the shoulder by the right hand, which then goes to its normal position on the small of the butt.

The sling should be tight enough to do its work of holding, but not so tight that it feels uncomfortable. Arrange so that the metal buckle is clear of the left hand and wrist as it may cause considerable discomfort.

If the sling slips slightly from the shoulder, it can be put back in position by drawing the rifle back with the left hand until the breech is under the right arm ; this will slacken the sling. Push it up to the left shoulder with the right hand and hold it in position there until the rifle is pushed forward by the left hand.

The effect of using the sling is that it does most of the work of pulling the rifle into the shoulder. If the right hand is removed from the small and the left palm is opened flat, you will find the rifle is still being pulled firmly into the right shoulder, though the sling causes it to cant horribly. You will notice that the strain of this work is taken where the sling goes round the left arm, just under the left armpit.

CHAPTER III

COMPETITIONS WITH THE .22 S.M.L.E.

Most schools arrange postal fixtures amongst themselves, the firing being supervised and vouched for by some officer or master. These are an excellent idea, and the same matches are fired from year to year, introducing keen rivalry and lending additional interest to the shoot. They are usually run as practice shoots for the "Country Life" Competition, though of recent years the S.M.R.C. decimal target competition has also been used.

Apart from friendly matches, there are three big annual competitions open to schools.

1. The S.M.R.C. O.T.C. Small-Bore Match.

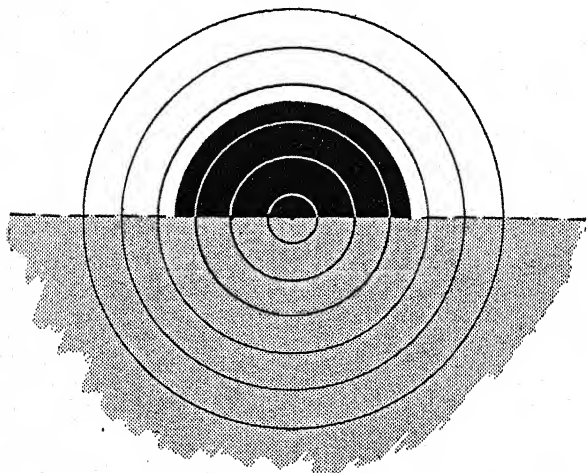
This competition is open to a team or teams of eight from any school O.T.C., and is fired during the autumn term.

In 1934 Sir Lionel Fletcher, who has always shown a very keen interest in school shooting, suggested there was the need for some competition for Junior O.T.Cs. other than the "Country Life" Competition. The S.M.R.C. organized one fired on the decimal target, and by the second year over seventy teams had entered.

Most schools found considerable difficulty in maintaining elevation with the round black aiming mark, so in 1936 this was changed to the half circle of the tin-hat target, together with the grey-blue and sand

coloured background of the army target. The sling is allowed in this competition.

The decimal target consists of five diagrams. Within the diameter of the aiming mark are three scoring rings, counting 10, 9 and 8 respectively. The rings are $\frac{1}{4}$ inch



apart, and the centre bull has $\frac{1}{4}$ inch diameter. To obtain a high score on this target with open sights and the S.M.L.E., the firer must have trained himself to a high standard of holding and trigger pressing. I know of two 99's made in the actual competition, but have not heard of any "possible" yet.

As a sight change of 100 yards raises the shot about 1 inch on the target, the sights of the rifle must be accurately known. A 50 yards change will take a shot from a six o'clock inner to a twelve o'clock inner. Thus the fine adjustment must be used. Do not, however, chase errors; it is easy to shoot well and just miss the bull all round, through changing your sights. It is best to shoot two or even three shots all inners in one direction before you make a change. If you are shooting to a good inner, be satisfied. It will be very hard luck if you do not score two or three bulls out of the ten shots, and a score of 93 or over is good shooting.

If your rifle is not central, get it zeroed as soon as possible, as the standard of accuracy required does not allow for faults due to aiming off.

2. The "Country Life" Competition.

This competition, organized by the Shooting Editor of *Country Life*, is the classic miniature competition for Junior Division O.T.Cs. It was started in 1912, and after the Great War the entrance had grown to vast dimensions and it was decided to award two trophies, the "A" Cup for units with a strength of $1\frac{1}{2}$ companies or over, and a "B" Cup for units of less than $1\frac{1}{2}$ companies. It is the most interesting miniature competition there is, for it combines the routine military miniature training with its practical application on a landscape.

It is based on the weapon training of the O.T.C., and is of very definite value from a military point of view. The firer is not only trained in those essentials of training, the group, rapid firing and snap-shooting, but he has also to apply his marksmanship to a landscape

target and bring his fire to bear on given points on the landscape, as directed by fire orders from a team leader acting as a section commander.

(a) Grouping.

This is done on the ordinary W/O 200/25 target that is used for the Empire Test.

Good grouping is the first essential of all good marksmanship. It is the ability to put all one's shots in the same place, irrespective of the bull; the smaller the circular group into which the five shots can be squeezed, the more accurate the marksmanship. The firer's hold, aim and let-off must all be correct to get a good group; all that remains is to apply the group to the bull by making the correct change of sights, combined, perhaps, with a slight aim off to right or left.

For this practice, get a comfortable position, with ammunition in a block close to hand. Align your sights and decide on the picture you will see over your sights. Take a couple of careful pressures, and then if possible fire the rounds straight through. To apply the group, remember you want to move the **centre** of the group to the **centre** of the bull, and 100 yards on the sight will change it about $1\frac{1}{4}$ inches on the target.

(b) Rapid.

This is the application of the group to a double diagram target of the same dimensions as before. But this time ten rounds have to be fired within one minute—five on each diagram.

On the word "Ready" the firers load and come into the aim; five seconds after "Ready" the word "Fire" is given, and after sixty seconds the command "Stop."

Space your ammunition loosely in two fives in the ammunition block; this will help you to remember to change diagrams after the fifth shot; get comfortable and try an aim before the command "Ready" is given.

When the first rapid practices are carried out, it is useful to call out ten-second intervals, so that the firers can judge their rate of shooting; but this must be discontinued once they have learnt to time their shooting, as it is not allowed in the actual competition.

Remember that the left or "pivot" elbow must not be moved during the shoot and the right arm as little as need be. Tilt the rifle slightly to the right and push the rounds well home into the breech with right thumb and first finger. The rifle should, of course, be kept in the shoulder right through the shoot. It is possible to fire the ten rounds coming down from the shoulder for each reload, but if you train yourself from the start to do it on the shoulder, you will find yourself with much more time for a steady aim and unhurried let-off.

Work the bolt with the thumb and first finger of the right hand and **not** with the palm. (Faulty extraction of the case is often due to this.) If you can speed up the loading process there is ample time for steady shots.

On the command "Ready," close the breech, aim, and take the first pressure so that there is no delay over the first shot when the command "Fire" is given. Do not dwell on any one shot, but be prepared to squeeze off a reasonably good inner with the sight alignment not quite what you would like it, rather than waste time over one good shot and be handicapped over the last two rounds.

Right through the shoot grip well and pull into the shoulder firmly with the right hand. Be careful on changing from the left diagram to the right for the sixth

shot that you are not having to strain over to the right ; a left group just out of the bull may be the result if you are.

If you can train yourself to fire the ten rounds in fifty seconds it is a good plan, as you thus have ten seconds to spare for the two accidents which may occur—a case that will not extract at first, and a round dropped into the magazine. (If the rifle does not extract properly it may mean dirt between the face of the bolt and the extractor claw. I find you can usually get the case out if you close the bolt again, press the bolt head to the left whilst you carefully open the breech again.)

(c) Snap-shooting.

Five rounds fired on the regulation 300/30 snap-shooting disc.

The squad being in position and rifle breeches open, the order "Ready" is given ; rifles are loaded and brought into the shoulder. The target appears for the first time five seconds after the "Ready," and is three seconds up and four seconds down.

Points *re* position, aim, quick loading, etc., given in the last section apply equally here, except that there is rather more time for loading than in the rapid.

Try to sight as near as you can to where the target will appear and take the first pressure ; there is then ample time for a good steady shot. One point should be noticed about elevation. The aiming mark is much bigger than that on the previous targets, and if one allows a thin line of colour between the foresight and the black there is a tendency for the shots to go low, especially on an open-air range in bright light. Sights up 25 yards on the rapid elevation is a safety measure.

(d) Landscape.

The team fires in four pairs, three shots per man or six per pair.

A black and white special landscape target is issued each year for the competition and is sealed and only opened by the superintending officer at the butt, when the rest of the competition has been completed. On it are marked four objectives in the form of $1\frac{1}{2}$ inch circles which are visible to the Team Leader through glasses or a telescope, but not to the firers.

After the target has been erected by the superintending officer, there is a period of seven minutes in which the Team Leader may describe the landscape to the team. He may use his glasses, but must not in any way indicate to the team the positions of the marked circles during this period.

At the end of seven minutes the superintending officer gives the order "Commence." The Team Leader then gives the first pair a fire order, finishing with the order "Fire" when he is satisfied that the objective has been identified by the firers. After giving the command "Fire" he must give no further assistance to the squad. At the end of two minutes from the command "Commence" the word "Stop" is given by the supervising officer. This sequence is then repeated for the remaining pairs.

Doubtless schools have their own methods of training for this, and I can only describe the way one school has trained with some considerable success.

At all costs, in the method you employ keep the spirit of the competition, which requires that the orders should

be in accordance with Small Arms Training, Vol. I Sections 47 and 50. Since a landscape that has not previously been seen has been used for the competition, the circles have always been very fair rifle targets which could easily be identified by ordinary military fire orders.

The Team Leader.—Great care should be exercised in choosing him, as on his orders depends the success or failure of the last part of the competition. I have usually found that a senior N.C.O. who shows self-possession on parade can make a success of the task. He needs to be a clear thinker and one not easily flustered. In addition, it is imperative that he should shoot reasonably well himself and that he is given shooting experience on a practice landscape target. He will thus understand the difficulties of aim the team experience and be correspondingly careful in his descriptions.

The Team Leader first looks through his glasses or telescope and carefully fixes the positions of the four circles; he studies the target as a whole and decides upon his method of description. Here the old method of dividing the landscape into left and right sectors, and the depth into foreground, middle distance and background, with respective ranges, will often be a very convenient way of preliminary description, but this will depend on the nature of the landscape.

Next he describes the landscape to the team, taking care not to use his glasses, so that he only sees and describes what they see and as they see it. Thus if a car appears as a black dot, he will describe it as a black dot, and not as it appears magnified through his lenses.

Indication points are picked out, described and named. These should be as few as possible, well apart, and not ambiguous. If a target is simple and easy to see, such

as a house window or a gateway, he should describe it as such and not waste time.

The clock ray method is most efficacious for other targets ; if you can, get your target at 6 or 12, 3 or 9 o'clock from an indication point. Firers have very different ideas as to what is, say, 2 o'clock on the target. In order to assist the firer, the order is given as : " 250. Top of signpost. **Right. Three o'clock.** Small bush."

The degree method may be combined with the clock ray method, but if so it should be practised with the sights of the rifle (S.A.T., Vol. I, 47) rather than the hands, as these vary to an astounding extent amongst boys. If possible, give the centre of the circle as the target rather than describe the circumference, as ideas will always vary as to its size.

Finally, it is sometimes necessary to fix the target's position from two indication points, thus getting intersecting clock rays. This is rather difficult and confusing for the firer, and should be avoided unless the other methods will not suit.

It is remarkable how any black object attracts the marksman ; given a circle that is half below a black hedge and half in it, five of the six shots will usually be found in the black half.

For the team there is little to add. They must be given as much practice as possible with landscape targets before the competition. First, under the direction of the Team Leader, they should aim without firing. If enough tripod stands are available, they can lay an aim on the target, and this can be checked. The amount of firing practice they can be given on landscapes will depend on the supply of these that can be obtained.

At the start there is one very important point to be checked. When one shoots at the rapid or snap target, one aims at six o'clock of the aiming mark, which is an inch or more below the centre of the bull; that is, one's shots, to be central in the bull, must hit from 1 to $1\frac{1}{2}$ inches above the aim. When, however, one shoots at, for instance, a small black window in a house on the landscape target, one wants to hit it and not the wall just above it. Thus each firer should find for himself the elevation to use in this practice.

On the word "Commence," the firers should load the first round, so that they need not take their eyes from the target until the first round is fired. When he has given the command "Fire," the leader is advised not to worry about that target, but spend the time thinking out his next fire order.

I will not detail the sequence of fire orders as they are given fully in S.A.T., Vol. I, 50. Remember the key word DRINK—Designation, Range, Indication, Number of rounds, and Kind of fire. Two of these are of little practical value in the competition, but they do help to keep the spirit of it.

3. His Majesty King George V Trophy and Imperial Challenge Shields.

This is the most gigantic rifle match there is. It is run by the National Rifle Association, and is open to schools (public, preparatory, girls', or any other kind), Officers Training Corps, Cadet Corps, Scout Troops, etc., in any part of the Empire. It was founded in 1910 by Colonel R. W. Fennell, to encourage boys throughout the British Empire to learn how to use the rifle. Its

trophies and prizes are numerous. I append the more important here :—

The H.M. King George V Trophy.

Awarded to the country or dominion as follows :— Great Britain, Canada, Australia, New Zealand, South Africa, India and the Rest, whose national representative team, selected from all the teams which have fired and aggregating not less than 3,000 scores to count, shall obtain the highest average per firer.

The Imperial Shields, Swords, Lord Milner's, Lord Roberts' and Governors' General Trophies.

The Imperial Shield (Senior) is awarded to the unit in which the senior competitors predominate and which, obtains, after adding its handicap points, the best average in the Empire.

The Imperial Shield (Junior) is awarded on like conditions, except that here junior competitors must predominate.

In connection with the above there are also the Sword of the late Admiral of the Fleet Earl Jellicoe and the Sword of the late Field-Marshal Earl Haig.

The Lord Milner Trophy.

This is awarded to the unit which obtains the highest figure using Government .22 S.M.L.Es.

The Lord Roberts' Trophy.

This is awarded to the unit in Great Britain to obtain the highest score. Similar trophies are awarded by the Defence Departments of each of the Dominions.

Medals of Honour.

The N.R.A. presents a silver medal of honour to all who score a possible or, if the S.M.L.E. is used, 95 and over. Bronze medals are awarded for scores of 99 and 94 with the S.M.L.E. These medals are of excellent design and should be much prized by the fortunate winners.

Badges.

These have the approval of the War Office and the Admiralty, and carry the titles "Empire Marksman" and "Empire First-Class Shot." Empire Marksman, 90 points (85 with S.M.L.E.), rifle and star; 1st Class Shot, 85-89 points (80-84 with S.M.L.E.), rifle.

The War Office has given permission for the practices of this competition to be fired as an alternative to the Miniature Range Rifle Course (*i.e.*, Empire Test). Class-firing badges are awarded on this, the standard being 70 ex 100 for 1st Class and 55 for 2nd Class.

As the S.M.L.E. is a handicap when compared with the target rifles used by the Dominion teams and most Home units, an allowance of five points per man is given to those who use this rifle.

I have coached a Colonial school (St. John's College, Johannesburg) for three years, and have since been connected with the firing of the same competition in an English public school—apart from supervising a Scout troops' firing. In each case I can say that the large majority of the boys thoroughly enjoyed the shooting, and it must have laid the foundation of many a shooting career.

The strength of the unit that fires is every boy in the O.T.C., school, troop or other unit, whose age is over

twelve and under nineteen years. Of these the best 50 per cent. form the team score to count, and this is reckoned as an average. As it is much easier for a small unit to produce a high average score than for a large one, a preference in the form of a handicap allowance is made at the rate of 2.5 per hundred boys, and seven points is the maximum.

The competition may be fired at any time from January to November, so that, no matter how large the unit firing, it is possible to fit it into the school year. Class-firing in the Empire Test is an arduous task in a big O.T.C. for those who have to organize it. There is little additional work to be done if the Imperial Challenge Shields Competition is substituted. In the first year there is some extra instruction on the new practices—especially the second—but beyond that there is little additional work over and above that which would have been expended on the Empire Test.

Each large unit splits up into a number of teams according to its size and organization ; these should not be too small, as at least eight scores in each team must count. The simplest basis for teams in a boarding school is the House. Each team is allotted the range for a fortnight or more, during which it trains and fires the competition. In my own school a House shooting competition is decided on this as well. To my mind this is infinitely preferable to a House team competition where a small team of eight experts competes ; if the competition is run contemporaneously with the I.C.S., every boy in the House has the chance to be in the best 50 per cent. which constitutes the team. Not only does this system increase keenness, but it improves the standard of shooting of the whole contingent or school,

shows the captain of shooting promising recruits for his Bisley team, and may help the national team by providing teams to be included in the 3,000 who represent their country for the H.M. King George V Trophy.

Shooting Conditions.

Firers are divided into two classes : juniors, who are under fifteen, and seniors, over fifteen and under nineteen years on the day the first team begins to fire.

The target used throughout the competition is the Bisley, 1924, 300/25 yards tin-hat target. Each target has two diagrams. The course is as follows :—

Junior.

		<i>* Points.</i>
10 rounds, deliberate ...	Standing, sitting, kneeling or prone	50
10 rounds in time limit of 2 minutes	Standing, sitting, kneeling or prone	50
Total ...		100

Senior.

5 rounds deliberate ...	Standing, sitting, kneeling or prone	25
5 rounds in 1 minute ...	Standing, sitting or kneeling, prone position barred	25
10 rounds rapid in 90 seconds	Standing, sitting, kneeling or prone	50
Total ...		100

The sling is allowed, and the section on the use of this should be read carefully. The instructor or captain of

the team should get the team to practise with them, and see that they are properly adjusted off the range and before any shooting is done.

Practice One (deliberate) needs no comment, nor do the rapid and time limit, which are very similar to the rapid of the "Country Life" Competition, except that the firer has more time at his disposal. The juniors' ten rounds in 120 seconds, or 12 seconds per shot, is almost deliberate shooting, for the firer should not need more than six or seven seconds for a good shot.

The difficult practice is the second—five rounds in one minute, prone position barred. Here the alternatives are standing, sitting or kneeling. Which is chosen may be decided partly by range accommodation. The standing position is by far the most difficult, especially for the less sturdy members of the team, as there is no direct support for either arm.

In the kneeling position the left arm is well supported near the left knee, making the position steadier than in standing. However, the backward slope of most firing points makes this none too easy. To my mind the steadiest position by far is the sitting. Here both elbows are supported, one near either knee. It is not, of course, as steady as the prone position, but it has the additional advantage over kneeling that, if a sloping firing point is used, the marksman can sit on the edge of it. If he sits well back, the breech will be a good 25 yards from the butt. I add here a brief description of either position as I practise it.

Kneeling Position.—Get into the sling in the normal way, keeping it close up under the armpit; the rifle is held at the "load." Take a walking pace forward with the left foot and sink down on to the right knee; sit on

the right heel if you can with comfort, rest the butt on the right thigh and the left forearm on the left knee. The left heel should be slightly behind the left knee, and the foot and leg pointing in the direction of the target.

For the aim, place the left elbow just **in front** of the left knee so that the lower part of the upper arm rests on the kneecap, weight well forward on to the left elbow ; this has the effect of keeping the sling taut and helps to steady the rifle. Because of the pull of the sling, I find the best right-arm position is obtained by sloping it downwards from the shoulder, as the horizontal right arm (which is the position without the sling) tends to let the butt slip below the armpit.

Once you have the aim position, there is no real necessity to move the left arm position at all. Just lower the butt from the shoulder, open the bolt, and reload with the right hand.

The alternative position is to place the left elbow behind the left knee, getting a grip against the fleshy part on the inside of the thigh. There is little to choose between these two, though personally I prefer the former. At all costs avoid putting the left elbow on the knee itself as such a position is very unstable.

If in the first place the left leg was forward in the direction of the target, the left arm will be well under the rifle to form a prop for its weight. The sling should prevent much lateral movement. (As with the prone position, the left hand forms a support for the rifle's weight and does not grip ; the right hand pulls it firmly into the shoulder.)

Get the round off quickly as you do in snap and rapid. Unless one has frequent opportunities of practising and

developing the necessary muscles, in spite of the sling, the rifle will tend either to swing across the target or move in a circle.

With practice a quick, steady shot can be fired whilst one is reasonably steady, if the finger has been trained to take the second pressure the moment the correct picture is seen.

Another method—and this is probably the best if a sling is not used—is to align the sights below the aiming mark and then move them up, letting the trigger go as the correct elevation is reached.

This is based on the fact that, when the rifle is moving in one direction, it is easier to keep it from any unsteadiness in other directions. But if the sling is used it is not very difficult to keep the rifle steady long enough to squeeze off a decent shot.

Sitting Position.—This is generally accepted as a steadier position than kneeling, and is preferred if the firing point can accommodate it. From a military point of view, it is useful when used for firing down steep slopes or across a valley. In either case, the ground on which the firer sits is sloping downwards.

If the edge of the firing point supplies a seat that is not too near the target, sit down facing half right, with the left leg pointing very slightly to the left of the target and the right well out to the right. Get into the sling as before and rest the left elbow on the inside of the left thigh just behind the knee, so that it obtains a grip on the fleshy part. If you find it suits you better, or if the firing point is raised rather high, the left elbow can be in front of the knee as in the kneeling position.

The right elbow is placed on the inside of the right thigh, a little back from the knee in a similar position to

the left elbow, and with the same bedding in the fleshy part.

Thrust the weight of the body well forward on to the elbows; this tightens the sling and tends to produce general steadiness.

Get a comfortable position and try the aim before shooting begins; there must be no straining. Once you have got the position do not move the left elbow, and, as with kneeling, you must shoot fairly quickly, training yourself to take the second pressure the moment you see a reasonably correct picture over your sights.

CHAPTER IV.

HOW TO SHOOT WITH THE .22 TARGET RIFLE.

1. The .22 Target Rifle.

In schools where there is no O.T.C. or Cadet Corps most boys learn to shoot with the .22 target rifle, the most common makes in use being the B.S.A., the Vickers, the Greener and the Dewar. All these are fitted with aperture—or orthoptic—sights, and have a sling fitted.

Without question the target rifle is the best weapon with which to teach very small boys to shoot. For example, the B.S.A. rifle is made in several sizes, from Model 1 Miniature Rifle, which only weighs a little over four pounds, and can be fitted with an aperture back-sight, to the No. 12, No. 13 and No. 15 Target Rifles, which weigh up to nine and a half pounds.

Many preparatory schools, where the age of the boys is from nine to thirteen, use these, and very excellent shooting is obtained as can be seen from the scores of such schools as St. Peter's School, Seaford, and Wellesley House School, Broadstairs, in the Imperial Challenge Shields Competition.

It is an almost impossible task to teach very small boys to shoot well with the .22 S.M.L.E. The rifle is too big for position, too heavy for a steady hold ; a rest is needed to take the weight, and this, together with the difficulty of correctly aligning open sights, does not produce good shooting.

These difficulties do not exist with the target rifle. As has been already stated, lighter rifles, suitable for small boys, can be bought and, with a lighter pull-off and the easier orthoptic sights, a small boy, ten or twelve years old, can produce excellent shooting on the 25 yards range.

On the other hand, the game is by no means too easy, and the older boy need not scorn it. In miniature rifle club competitions targets are used where the highest scoring circle is very small indeed—.225 in. diameter at 25 yards. Thus, not only must the weapon be capable of this degree of accuracy, but the marksman must also be as near perfection as possible in his aiming, holding and let-off, if he is to get the full score over a ten-shot shoot. The slightest unsteadiness means the dropping of at least one point. Miniature shooting which makes such exacting demands proves a great attraction, and one is not surprised to find that many thousands of enthusiasts are well content to shoot with the target rifle only, and leave the much more expensive open range severely alone. Not only can they shoot shoulder-to-shoulder matches with other clubs, but throughout the year, either out of doors in summer, or indoors with artificial light throughout the long winter evenings, they can get limitless practice at a comparatively small cost, and take part in the innumerable postal matches and league competitions which the Society of Miniature Rifle Clubs ably organizes.

But for the open range marksman also it is invaluable. When he goes "stale", begins consciously or unconsciously to anticipate the recoil of his rifle, or snatches at the trigger, nothing discovers his faults so easily or helps him to steady himself down again as a little time

spent with a .22 target rifle. And do not forget, as I have said before, that many full-range marksmen learnt to shoot this way. Their success is our recommendation.

2. Position and Hold.

There is but little to add to what has already been said under the section dealing with the .22 S.M.L.E. about position, hold and the use of the sling. Perhaps it is true to say that, with an easier balance and specially constructed hand grip for the right hand, the holding is much easier, and with the wide angle of the body and the left hand as far forward as possible right up the fore-end to the sling swivel or hook, it is easier to make the sling and the right hand do all the gripping and pulling into the shoulder, the left hand merely holding without any finger grip.

Perhaps it would be of value briefly to recapitulate the chief points of position and hold as given before, making the slight adaptation necessary for the target rifle.

1. Take the wide-angled line of inclination to the line of fire, with the legs well splayed and the body hugging the ground.

2. Put the left arm through the sling from the left, then hand under and over sling again from the left side, to hold the fore-end against or towards the fore sling fixture. The sling must be well up under the armpit and properly adjusted. A loose sling against the elbow is useless.

3. Place left elbow a little to the left of the rifle and right elbow out to the right, but not so far that there is any tendency to slip.

4. Place the butt against the right shoulder, well in from the blade, so that the fleshy part makes a bed for it.

5. Hold, but do not grip the rifle with the left hand, which should be nothing more than a prop. If correctly adjusted the sling will do the work of pulling the rifle into the right shoulder, and such strain as there is is felt where the sling passes round the top of the left arm near the shoulder.

6. With right hand hold the small of the butt firmly, with the trigger finger curled round the trigger so that the second joint can press it.

3. Sighting—Aperture Sights.

The new feature of the rifle is the orthoptic, aperture, or "peep" sight, as it is variously named.

This sight is frequently confused by the uninitiated with telescopic sights. "Anyone could shoot with telescopic sights!" you are told. Such sights do exist, but they are completely different from aperture sights, and are used chiefly in certain game shooting and in sniping competitions at Bisley. As a matter of fact, they are not easy to use, and the beginner makes a hopeless mess of his first shoot with them.

On the miniature range the aperture backsight is most frequently used with a ring foresight, though there are certain competitions in which a blade foresight only is allowed.

Most target rifles are fitted with an interchangeable foresight blade and ring, whilst Messrs. A. G. Parker & Co., of Birmingham, make a form of foresight which provides blades and rings of varying dimensions, together with a tunnel sight protector which excludes the light reflected from other targets.

The aperture sight is simply the substitution of a peep hole in a metal disc for the U backsight. The eye looks through this as through a window and has only to concentrate on two things, the foresight and the aiming mark.

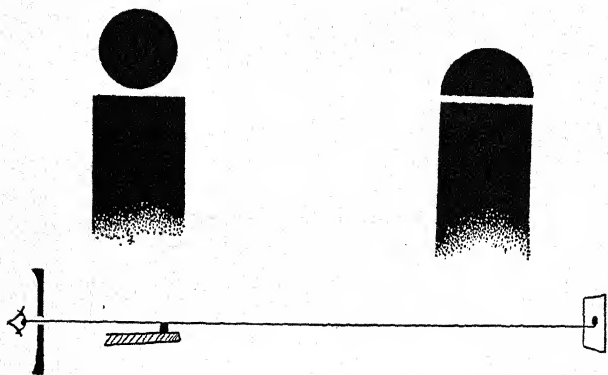
We have already seen how, with open sights, it is impossible to focus both backsight, foresight and aiming mark, even when the range is a short one like those met in miniature clubs. This difficulty is somewhat overcome as the eye has not to focus the aperture backsight—it merely looks through it as through a window—and, as before, has a foresight to focus against a background of the target. As before, concentrate on focusing the foresight, or otherwise the same big error may occur as that shown to result from focusing the aiming mark and losing the foresight when the S.M.L.E. with open sights is used.

The Blade Foresight.

We have seen that when we aim we must see the same picture every time over our sights. With a peep sight, although there is no conscious aligning and all that the firer has to do is to place his blade foresight in the correct position on the target, it must be the same position all the time.

In most miniature competitions the aiming mark is a black circle, though there are occasions when the black semi-circle of the tin-hat target is used. Whereas it is comparatively easy to keep the same picture of a thin line of space between foresight and the aiming mark when it is the tin-hat, it is by no means so easy to keep exactly the same picture when the aiming mark is a black circle on a white background, especially as the

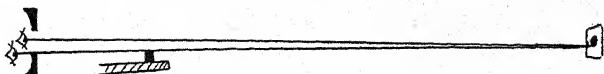
bright lights used on some ranges make the outline of the bull very indistinct. As there is no clear-cut line for a six o'clock aim, it is only too easy to let the foresight impinge upon the bull, or overestimate the space left between the foresight and aiming mark. This



CORRECT SIGHTING WITH BLADE FORESIGHT.

difficulty is increased when, out of doors, one meets with variable light on a 50 or 100 yards range. This does not arise if the competition allows the use of the ring foresight. With this shooting becomes mainly a question of holding and trigger pressure.

When the aiming mark is a circle and the competition allows the ring foresight, use it; when the aiming mark is the tin-hat, use the blade.



The eye is said to look through the centre of the aperture backsight unconsciously ; as soon as the eye gets far from the centre, there is a tendency for the aiming mark to become blurred or distorted. This is the signal for the firer to come down from the aim and start again. However, when the blade is used, it is possible where the aim has been, say, too low, to get a correct if somewhat blurred picture by lowering the eye in the aperture, especially if a large one is used.

As the true aim from the centre of the aperture is a low one, the shot will be low, too.

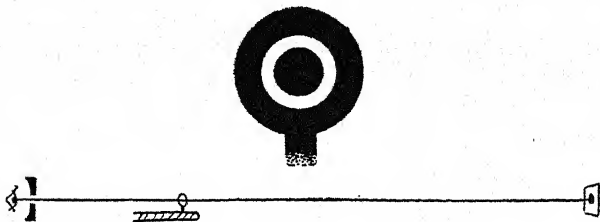
The aim taken when this sight is used also varies with the light. Out of doors on the open range especially, when the light is good, I see the foresight clearly ; it comes into view clearly in the full. The aiming mark is also clearly viewed in its full. In conjunction the result is a low shot.

When the light is dull, the view of the foresight is not so clear, hence we hold it higher to make it appear plainly. The aiming mark on a dull day also appears smaller as the outline is not so distinctly seen. The combination of more foresight, taken unconsciously, and holding that foresight to the apparent outline of the aiming mark, results in a high shot.

The Ring Foresight.

The use of the ring is simple ; all the firer has to do is to look through the peep and get the black circle of the aiming mark central in the ring. Here the difficulty of

focusing is completely removed. All that one has to see is the aiming mark central in the ring ; whether the ring is clearly defined or not does not really matter, though it is usually fairly clear.



THE AIM WITH THE RING FORESIGHT.

All that remains to be settled is the size of the ring and the aperture. The ring should be a thickish one with not too small a hole in it—.08 inches is the smallest you should use. You must have a broad belt of light between the ring and the aiming mark for the bull to be well defined. If too small a one is used, the eye begins to strain towards the aperture in an effort to see more clearly, and, in addition to much fatigue, a shaky shot will probably result.

On the other hand, use as small an aperture backsight as you can without losing definition ; six-hole eye-pieces are made, and the aperture can be closed down by simple rotation.

Having settled the size of the ring and aperture, there remains the position of the eye relative to the sights. When the eye looks through the peep, it may get out of

the centre, and a high or low, left or right, shot will follow. Given the opportunity, the eye will automatically choose the centre of the aperture, but the beginner frequently looks through the side. If, on coming into the aim, the bull blurs or seems to become slightly oval in shape, you may take it that the eye has left the centre of the aperture; there is only one thing to do—come down, rest the eye, and start again. If you fire when the aiming mark is blurred, you may be sure your shot will be out of the bull in the 9 or 8 rings or even in the “white.” The chances of the eye leaving the centre are lessened if a smaller aperture is used. The most common reasons for the eye leaving the centre are (1) the face pressing harder on the butt, and (2) the butt in a higher or lower position in the shoulder.

The right eye should be kept the same distance from the peep of the backsight for each shot. (On the miniature range there is no disadvantage from having the head well forward; but those who shoot with aperture sights on the open range may receive unpleasantly bruised noses from the recoil, if the head is too far forward.) The head should come naturally to rest on the butt so that there is no neck strain from craning forward.

Remember that the aim should be a quick one; do not dwell on the aim, and drill yourself into the habit of letting a trigger squeeze follow the registry of the correct picture.

4. Trigger-Pressing and Sight Adjustment.

There is no need to repeat the instruction about breathing; that has already been mentioned in connection with the S.M.L.E., and has exactly the same

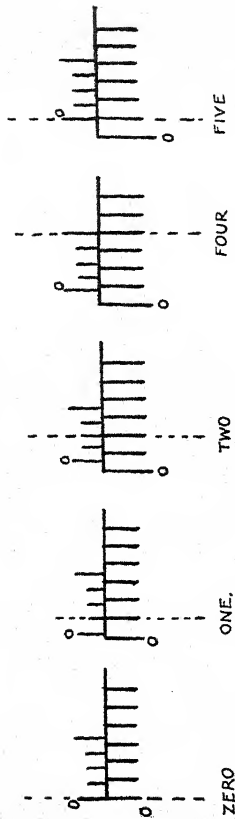
application here. Perhaps the results of pressing the trigger when restraining the breath has become an effort are more evident in the wideness of the shot which results when the target rifle is used.

There is only one pressure to the rifle, and that is only three pounds, compared with the five to six pounds' pressure of the S.M.L.E.

We have seen that the right hand is gripping the small of the butt, so that the first or second joint of the finger can comfortably curl round the trigger. As the foresight, blade or ring, is seen in the correct position in relation to the aiming mark, the pressure on the trigger is gradually increased until the striker is released and the shot fired. All that is necessary is that no other part of the rifle shall move whilst the trigger is pressed.

Those who have difficulty in controlling the squeeze may find it helps if they concentrate on gripping just a little harder with the right thumb; as this is already in close contact with the butt and cannot move, the first finger automatically makes a like pressing movement and lets off the round. The pressure exerted must be just enough to release the striker and no more, otherwise the movement becomes more of a snatch. Greater self-control is developed if the firer schools himself to "follow through" with each shot, staying steady in the aim a second or so after the shot has been fired.

In order that there may be quick co-ordination between sighting the rifle and firing, the marksman cannot do better than drill himself with limitless aiming and trigger-pressing practice. (N.B.—When this is done with the target rifle, an old case is put in the chamber to protect the striker from wear and damage.)



THE VERNIER.

Most target rifles have either the B.S.A. or the Parker-Hale aperture backsights. They can be adjusted both laterally and vertically to bring the shot into the bull. On top of the sight there is usually a milled screw ; by turning this clockwise the sights are raised, and by turning it anti-clockwise the sights are lowered. To the right of the sight is another milled screw which controls the horizontal adjustment or windage ; similarly, by turning this clockwise the sights are moved to the right, and anti-clockwise to the left. Each of the screws has also a scale attached to it, with five-minute graduations, and a simple vernier to read single minutes. On the better makes of sights, when the screw is rotated it clicks, four clicks to a minute. If it is remembered that a change of one minute means a change of a quarter of an inch on the target at 25 yards range, the firer will have some idea of how big a change to make. On the decimal target the scoring rings are exactly a quarter of an inch (that is four clicks) apart ; by these the adjustment necessarily is easily reckoned.

After the correct sighting has been found, the vertical and lateral sights should be read and noted down as a starting point for the next shoot.

Although by counting the clicks from the zero (marked " O "), the five- or ten-minute mark, the sights can be adjusted to any elevation or windage, it is easier to use the vernier and then have to add only the odd fraction of a minute.

5. Target Rifle Competitions.

If a school considers its shooting good enough, there is no reason whatsoever why it should not enter for some of the numerous open club competitions and leagues

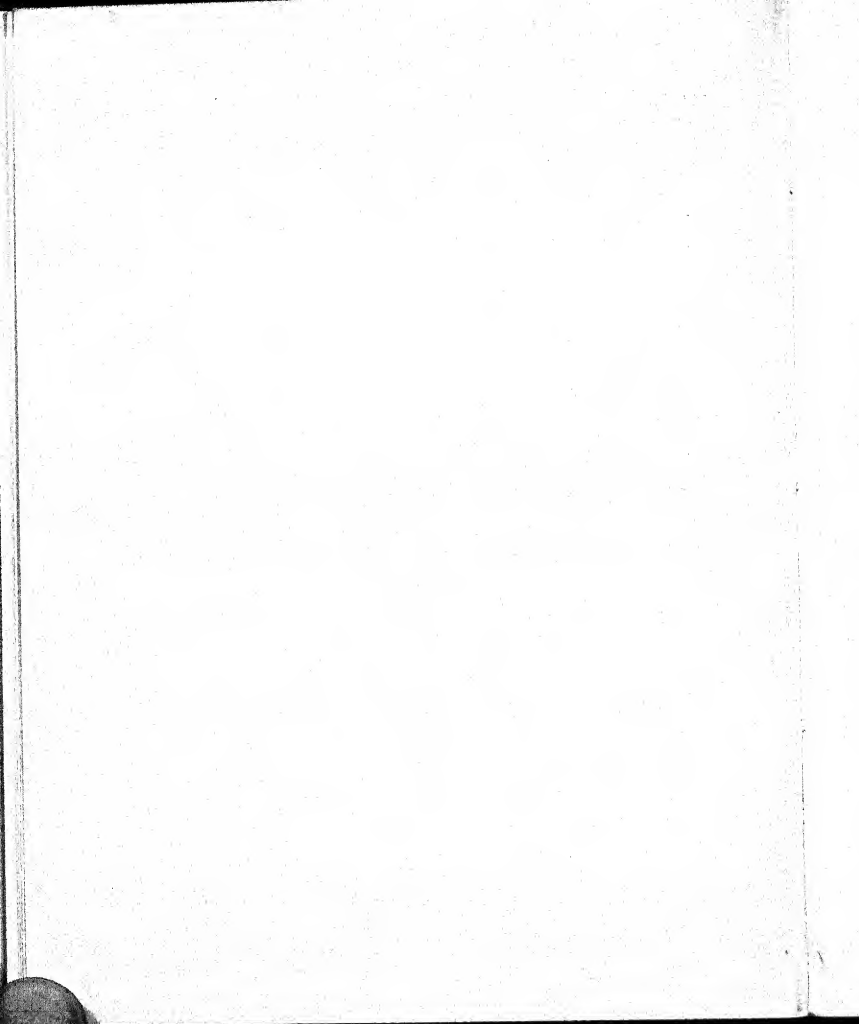
arranged by the Society of Miniature Rifle Clubs. There are, however, a certain number of matches for schools or boys only.

First, there are the Junior Spring, Summer and Winter Competitions, one taking place each school term. Four firers constitute a team, and the school may enter as many teams as it likes. Twenty rounds on two decimal cards are the simple conditions ; thus it is a test of sheer accuracy of shooting. There is also a minor section to each of these matches for teams of boys who are under fifteen. This gives a chance to teams from preparatory schools and the younger boys in the larger schools, who would not stand much chance in the major section.

The Boy Scouts' Association Competition for the Connaught Challenge Shield is a competition for Scout troops, school or otherwise. Here teams of six Scouts fire ten rounds deliberate and ten in 90 seconds at decimal cards.

The King George V Trophy and Imperial Challenge Shields Competition has already been described fully under the .22 S.M.L.E. matches. Most Dominion schools compete for this with the target rifle which is allowed by the conditions. As there is a junior as well as a senior trophy, no school is too young or too small to enter. In fact, some of the English preparatory schools produce a remarkable standard of marksmanship and occupy very honourable places in the final results.

Although an aperture backsight is permissible, the ring foresight is barred, the blade only may be used. Other conditions are described in the previous chapter.



PART II.—THE OPEN RANGE.

CHAPTER V.

PREPARING FOR THE OPEN RANGE.

When the marksman changes from the 25 yards range and the small bore to the open range and full bore, he does not find the accurate weapon he has been used to in miniature. With the miniature rifle, a shot that went wrong was the firer's own fault, but with the .303 service rifle the standard of shooting will depend on the capability of the individual rifle, as well as the individual marksman. The rifles vary tremendously, and it is the task of the instructor to see that the most accurate rifles are at the disposal of the shooting team.

The following section is a rough guide to selecting and testing the rifles. It is thus intended primarily for the instructor, but it should be of interest to the marksman as well.

Selecting and Testing the Rifle.

There is a limited choice of rifles for open range shooting, as it is a condition of all public schools rifle matches that the rifle must be of Government manufacture and on charge of the contingent.

The rifles supplied to O.T.Cs. are of a very good quality and kept in a good state of repair by the circuit armourers who visit the contingent from time to time.

If the rifle on examination has any major faults it is condemned, and for lesser repairs it is sent away and thoroughly overhauled. As a result, if they are well cared for by the unit, the majority of the rifles should display reasonable accuracy when fired on the full range at an army target. In some contingents where class-firing is carried out on the open range, each cadet fires with his own rack rifle.

However, for team shooting much greater accuracy than this is required, as the Bisley bullseye is only a small fraction of that of the Army target, and this requires the finding of the rifle which groups very closely. It should thus be arranged that the team marksmen should have the pick of the rifles, and that they should be set aside and not used for drill purposes or ordinary parades, much less be used for firing blank cartridges and face the perils of field days. Most schools have some privately owned D.P., S.M.L.Es., and if there is any shortage these can be used for drill purposes. Suffice it to say that when the "super-accurate" rifle is found it should be treated as the treasure it is.

According to Equipment Regulations, Part III, para. 69, on application to the Chief Inspector of Small Arms, Enfield Lock, rifles may be rebarrelled at a cost to the contingent of £1 a rifle. If, say, half a dozen rifles with well-seasoned woodwork are sent up annually for rebarrel, the team can start a new year with good material from which to make a selection. As the wind gauge is allowed in the Ashburton Shield Competition, and the use of this is a very definite advantage, when rifles have been condemned or new rifles are being supplied, a request should be made to the authority in question to supply a good proportion with wind gauges,

as they will be wanted for this competition. I have always found them very obliging in this matter.

But a new rifle with a new barrel will not necessarily mean a more accurate weapon. One can fire new rifle after new rifle and find that they all produce a reasonably good group, and then a very old, worn-barrelled weapon produces a group of less than half the size !

It must be realized that, unlike the .22 rifle, the S.M.L.E., if correctly fired, does not put all its shots through the same hole ; it fires a group, and these groups differ from rifle to rifle. They must be fairly accurate or they would not have passed the armourer's grouping tests, but that group is rather bigger than the 200 yards bull on the N.R.A. target.

In one's search for the super-accurate weapon, there is only one thing to do—take them out, one by one, and give them a thorough test on the 30 yards range, if you have one, or on the open range at 100 yards.

The rifles for the shooting team will probably be selected by the Regimental Sergeant-Major or other Permanent Staff Instructor who, when he makes his examination, will probably take into consideration the following points :—

1. That the rifle has a wind gauge.
2. That the barrel is visibly in good condition, with good lands and not gauging over .30375, as although a .304 barrel may shoot very well, its life is not likely to be as long as a " tighter " one. It should also be free from scratches, bulges, etc.
3. That the barrel is free to move in the noscap. This can be tested by pushing a pencil or a dummy round in the muzzle and pressing down towards the bayonet boss. The barrel should give slightly, and when released

return to its original position, pressed back by the fore-end stud and spring. If there is no movement, or the barrel moves and does not return to its former position, either the woodwork of the fore-end is warped or the fore-end stud needs attention. In any case, the rifle is not likely to shoot well until the armourer has attended to it.

4. That the mechanism is in no way faulty.

5. That the woodwork is in good condition. This does not necessarily mean new ; a well-seasoned fore-end is an advantage, as it does not tend to warp when exposed to the sun, rain or the heat generated by rapid fire as does new unseasoned wood.

6. That the let-off is about $5\frac{1}{2}$ pounds and not much more, and that the action of the trigger pressure is smooth.

Adjustments Permitted by the War Office.

Certain simple minor adjustments are permitted by the War Office (*vide* A.C.I.). These should be carried out by a competent armourer only.

By interfering with the "stocking up" of a rifle, altering components and inserting packing material between the barrel and the fore-end, it is possible sometimes to give the rifle, temporarily, greater accuracy at the shorter ranges. This is not a permanent correction, it frequently causes serious damage to the rifle, and, what is more to the point, it is **strictly forbidden** by the Army regulations.

When a rifle has been manufactured or repaired, it is very carefully tested and adjusted by firing before it leaves the factory. But, as has already been stated, the rifle does not retain this original accuracy necessarily,

due largely to warping of the woodwork. The grouping powers of the rifle become affected and there are slight innocuous adjustments generally recognized which may be affected by competent armourers.

The following alterations are allowed :—

Elevation errors may be corrected by the change of foresights, or by lateral adjustment.

The fore-end may be floated out to correct errors due to slight warping of the woodwork. The same applies to the handguard.

The front guard screw and collar may be shortened by an amount not exceeding one-sixteenth of an inch.

The bent of the cocking-piece, the nose of the sear, or the ribs of the trigger may be adjusted to correct the " pull-off " within service weight limits.

Additional band screw washers may be inserted to ensure that the inner band is pressed down on the barrel.

As already stated, the butt is manufactured in three sizes to suit individual requirements. The butt stock may be changed to long, normal or short.

At rifle meetings it may be impossible to obtain the services of regular armourers. If so these adjustments to Government rifles may be carried out by competent civilian armourers.

There are several firms of reputable civilian armourers which are represented at Bisley who will examine, adjust according to A.C.I., test and zero the rifles at the beginning of the season for a reasonable price. Of course, for a number of rifles this is a considerable expense, and many schools test and zero them for themselves, only calling in outside assistance when the rifle fails to do itself justice. (The R.S.M. or P.S.I. in charge

of the armoury of the contingent should be a competent armourer. Courses are run from time to time by the Military College of Science, Woolwich, and a contingent P.S.I. may attend one of these.)

To Test and Zero the Rifle.

Many schools are fortunate enough to have their own 30 yards range ; others have either to go to the nearest open range and test at 100 yards, or may be allowed the use of the 30 yards range of the regimental depot to which they are attached. Of the two, I prefer the 30 yards range, for here the targets used are close at hand and can be kept for reference, the range is so short that the effects of wind on the bullet may be ignored on the stormiest of days, and the aiming mark is small compared with the 12-inch tin-hat at 100 yards, which is too big to encourage accurate aiming.

The rifles to be tested are cleaned thoroughly and the barrel dried out most carefully. The butt swivel can be changed and a sling attached if required ; in any case the rifle will be fired with the left wrist resting on a sandbag to give as much steadiness to the firer as possible.

(*N.B.*—Do not rest the rifle itself on the sandbag, for not only is it difficult to get your normal firing position with the extra support, which is difficult to arrange at the correct height, but the actual firing itself may be affected.)

Either the P.S.I. or the most reliable marksman should fire the test groups, as this is a test, not of the marksman, but of the rifle ; the element of personal error must be reduced to a minimum. Personally I prefer to use the 200/25 Bisley target to the War Office

30 yards target, as the aiming mark of the former is both smaller and more clearly defined, but this may not suit others.

A group of ten rounds is now fired. I usually put the sights up to 300 yards so that the group, should it be on or near the bull, will not distort the aiming mark. The firer must conscientiously nominate any rounds he thinks incorrectly fired, so that these may be discounted from the group, and, for this reason, it is best to have somebody spotting the group as it is fired, for he can thus see how it is built. At this stage it does not matter where the group is; sight adjustment and zeroing will follow later, when the rifle has proved its capability of putting all the rounds into a small circle. As the bull at 200 yards on the N.R.A. target is five inches, a group that will be within the bull must be in a $2\frac{1}{2}$ -inch circle at 100 yards or $\frac{3}{4}$ -inch on the 30 yards range.

Two groups should be fired this way, and if these are satisfactory and the test is to be a thorough one, fire ten rounds rapid, and then immediately fire another group. Compare very carefully this third group with the previous ones, not only with a view to the size but also elevation, as some rifles, when heated up by continuous firing, begin to drop away badly. The rifle which produces an "O" shaped group is the one which begins to drop away after the fourth or fifth shot at 200 yards. If it does this, it should be set aside until it can have a further examination by the armourer.

It is a peculiarity of the majority of unpacked S.M.L.Es. that, though the group may be from 7 to 8 inches at 200 yards and needs more than the bull to hold it, back at 500 yards the same rifle, if wind is discounted, can group well within the limits of the bull.

When the rifles have passed muster for grouping, they should next be zeroed. Special zero targets can be bought, but an ordinary target with a vertical line drawn through the middle of the aiming mark will serve just as well.* See that the wind gauge is central, and fire a careful group of five rounds or more, using the sling and rest as before. The P.S.I. or armourer on the spot can move over the foresight to left or right, according to the position of the group, with a special hand-vice; a second group is fired, and if this is not satisfactory a further move is made in the foresight. The group should be as central on the zeroing line as possible. (Messrs. Parker-Hale, of Birmingham, make a special vice for this work; it is graduated so that the sight may be moved over any given number of minutes.)

Similar testing and zeroing can be carried out at 100 yards on the Bisley 4 foot target if no 30 yards range is available.

One other very important adjustment still remains—that of elevation. If on the War Office 30-yards target the group is in the black aiming mark when the sights are set at 200 yards, an elevation of between 200 and 300 yards is usually correct on the open range. After being caught rather badly on two occasions, I always view a group above the black with extreme suspicion. I have twice taken away school VIIIs for friendly matches, once against another school and once against a university team, and have found on a dullish day, with a range that sloped down towards the butt, several of the team at 200 yards were hitting the magpie ring at

* A plumb line is necessary to ensure that the zero line on the target is vertical. A further group should also be fired with the sights raised to 600x. to test whether the backsight leaf itself is true or not.

12 o'clock with the backsight slide right against the wind-gauge. The only thing they could do was to aim at 6 o'clock down the target. Very poor scoring resulted.

It is thus much better to have an elevation of from 250 to 300 yards at the 200-yards range ; then, given a dull day or unusual conditions, you can take off another 25 to 50 yards.

Thus we have satisfied ourselves as to the grouping capabilities of the rifle ; we have centred it on the wind-gauge, and made sure that at 250 to 300 yards elevation the firer will be in or about the bull at 200 yards range. Only now may the rifle be regarded as suitable for the marksman's hands, for no matter how well he shoots the results will be governed by the capabilities of the rifle. Many a time a beginner, full of zeal and enthusiasm, has been completely discouraged by being allotted for his first shoot a weapon that would not group to the inner at 200 yards if fired by a King's Prize winner.

It is always of the utmost importance to distinguish between the bad shot that is due to the marksman and that due to the rifle. If there is any doubt as to which of these it is, a few rounds fired by some other reliable shot will soon settle the question.

Grouping and Aiming Practice for the Marksman.

We have seen that the marksman who has learnt to fire the .22 S.M.L.E. has an advantage over the user of the target rifle when he comes to the open range, as he is firing with a weapon to which he has grown accustomed. There is but little change when he takes his position, hold, aim and trigger pressure. There is therefore no necessity to repeat all that has been written in Chapter

II, though those who have not fired in any competitions in which the sling is allowed must study how to adjust and use the sling, and practise this off the firing point until they are completely at home with it (*vide* Chapter II *d*).

On the miniature range the marksman has learnt to use the service rifle under ideal conditions—namely, without the worry of calculating the deflection of the bullet due to wind, with little trouble from changing light, without the slight shock due to the recoil and noise of explosion, and with a weapon that is 100 per cent. accurate if properly handled.

He has, then, practised position, hold, aim and let-off, and has learned to shoot with reasonable accuracy on the miniature range.

He is now, we will say, about to fire the service rifle, full-bore, at the 30-yards range.

As a preliminary he should understand that there is no need to worry either about recoil or noise of the explosion, for these are really negligible. If a small wad of cotton wool is put in the ears the crack of the rifle is noticed but little more than the "phut" of the .22 rifle, and if the rifle is correctly held by the sling and right hand well into the shoulder, the bump of the recoil is hardly felt at all.

After firing for a good many years, I have only twice experienced any after-effect from the recoil when firing the service rifle with open sights. Once I had a swollen chin from pressing rather hard on the top of the butt with it, and on the other occasion a bruised shoulder, due to the brace-adjusting buckle getting in between the butt and my shoulder. There is no need at all to be gun shy.

If you have not fired a .303 calibre round before, the first five rounds should be fired merely with a view to getting accustomed to the different sound and recoil. Concentrate on the "follow through" idea over your sights, and notice how the rifle seems to whip up and down, returning, if it has been steadily held, to approximately the same aim as when it was fired. This idea of watching your shots through the sights has an excellent steadying effect on your trigger-pressing and hold.

If the school has a 30-yards range for practice, the firer practises grouping until he can put all five shots at least into an inch circle. There is no useful purpose served in proceeding to the 200 yards firing point when you are only getting, say, a 4-inch group at 30 yards. Four inches at 30 yards means nearly 27 inches at 200 yards, and as the inner ring is only 24 inches in diameter at this range, your group is well in the magpie ring. For those who have not a 30-yards range available, the only course is to do the same grouping practice at 100 yards at the 4-foot target. Here the aim should be to narrow down the group to $2\frac{1}{2}$ inches, which would mean the size of the bull at 200 yards.

One further preparation can be made off the open range, if space permits, and that is 200-yards aiming practice.

We have already seen that it is impossible to focus both backsight, foresight and aiming mark at one and the same time, and have decided that, at the moment of firing, the foresight must be seen clearly. It will now be found that, whereas the black could be seen fairly distinctly behind the focused foresight when the range was only 25 yards, at 200 yards—and more especially at 500 yards—this is ill defined and in poor light may be

very blurred indeed. Not only that, but at 500 yards the target itself seems very puny behind the sights.

At my present school there is a terrace overlooking a shallow valley of green fields, and at 200 and 500 yards wooden 4-foot and 6-foot targets respectively are erected every spring, and all are encouraged to do about one quarter of an hour's aiming practice every day they are not on the open range. (Actually our nearest full range is twenty miles away, and this form of practice is invaluable, as it is a special treat for us to get two shoots within the week.) The firer thus gets used not only to position and hold, but also to the pictures he is going to see at 200 and 500 yards, especially as he sees them from day to day in every variety of different light. To make the practice more real, he puts his sights up for the 500 yards aiming practice. This is not merely a fad, for the butt position and the position of the cheek on the butt may be slightly different when the backsight leaf is raised for the higher elevation.

All this can be done away from the open range, and at no expense to either the firer or the school. It is really a sort of routine drill which will make the essentials of correct shooting become almost automatic when a full-range shoot has to be fired.

CHAPTER VI.

THE SERVICE RIFLE ON THE OPEN RANGE.

1. Preparing to Shoot.

Before we shoot at 200 yards there are a few preparations to make. On the miniature range the knowledge that one's sights were correct and sling, if used, properly adjusted, was enough to make us draw our ammunition and commence to shoot our group or, if we were using the target rifle, we focused the telescope and began to score a series of bulls on the card. Preparation is but little, records—except of sight, elevation, and points scored—are not kept. Perhaps we should shoot better if we did keep some kind of score-book on the miniature range. One could turn back to the bad shoots and relearn the lesson they should have taught us.

There is considerable preparation to be made for the full-bore shoot, but it soon becomes mere routine work.

The rifle is, of course, first cleaned and dried out. This I have dealt with separately under the section on cleaning and care of arms. If the school does not provide one, buy for yourself a canvas rifle case. This not only protects it from any knocking or friction with other rifles in the bus or train on the way to the range, but will also prove a God-send in wet weather, for you need not take the gun out of its case until your turn to fire.

If the team's rifles are packed in a bus, be responsible for your own weapon ; check its number, and see that

you have a bolt and that it is your own bolt. The fact that you feel an utter fool when you get to the firing point boltless is a minor consideration. You might just as well be without the whole rifle, for someone else's bolt will not serve. An afternoon's disappointment and poor shooting may follow, and this could have been avoided so easily by a simple commonsense precaution. You may think this point is being rather laboured, but most people have suffered this way. I once arrived on the firing point at Bisley during the Imperial Meeting—fortunately ten minutes before I was due to shoot—with overcoat, telescope and tripod in one hand and a large shooting case in the other, but without a rifle. My shooting was not improved by the fact that I eventually arrived breathless and rather late on the firing point.

I was very glad to hear Captain J. A. Barlow, when he presented the prizes at the Sussex Public Schools Open Meeting at Bisley in 1935, advocate the use of a coat for shooting. I had for some years recommended their use to my team. They have the great disadvantage of making the firer uncomfortably hot in hot weather, but they do make a padded bed for the butt and make the sling more comfortable on the left arm. Some firers complain that when they are wearing little clothing on the arm, they sometimes find the beating of an artery actually moving the rifle slightly; personally, I have never experienced this difficulty. If you do not like to wear a greatcoat on a hot day—and it need only be worn whilst you fire—a sleeved pullover under the tunic will serve much the same purpose. At all events, the moral is, wear plenty of clothing under your tunic. For the rest it does not much matter what you wear—O.T.C.

camp khaki shorts and puttees are as good as anything in hot weather. If, on the other hand, it is cold—keep warm. It is very difficult to shoot well when you are dithering from cold.

In the Ashburton and other major public school matches uniform is compulsory. Though it is much more comfortable to shoot in an open-necked shirt, flannels and a blazer, one should get used to firing in uniform at least for the last few practices before the Bisley meeting.

Always be at the firing point at least ten minutes before you have to shoot, whether it is at Bisley or on your own home range. You will never see an expert shot arrive late for his shoot. He sits behind the firing point opposite his target and quietly studies the conditions; he may watch the man who is shooting before him.

The rifle should be prepared before you step on to the firing point; that is, the foresight, backsight and their protectors should all be blackened with dead black or a candle flame. (A bit of burning oily rag will do if there is no dead black handy.)

The score-book is entered up with details of shoot, weather conditions, elevation to be used for sighting shot, etc., and the rifle sights adjusted accordingly. It is a good policy always to observe the same sequence of changing sights, and then entering the change in the score-book, otherwise you will one day make the change on paper but not on the rifle itself. Finally, don your elbow-pads and, if you are using a telescope, fix it on its tripod or stand and focus it ready for use. You should have either a telescope or binoculars to watch the positions of shots as they are signalled on the target so that you can accurately plot them in your score-book.

You will thus, when you get down upon the firing point, be able to make yourself comfortable and start to shoot with the minimum of delay. In O.T.C. squadded competitions at Bisley there is a definite time-limit for each detail to shoot, and a definite individual limit of one minute a shot, so that if you do not waste time, the last detail of your team will not be handicapped by having to shoot faster than they are accustomed to ; there will also be time to challenge the value of a shot on the target should this be necessary.

2. The Sighting Shot.

The first shot to be fired at each range is the sighter. Do not underestimate the importance of this shot because it does not count on your score, for it is in actual fact the most important shot you shoot.

We have seen that the rifle does not put all the bullets through the same hole, but fires a group, the size of the group varying with each rifle. If we multiply the diameter of the groups we have been getting on the 30-yards range by seven, we shall obtain approximately the size the same group would be at 200 yards. (The size of the 100-yards group should be doubled.) Thus, if all the shots are within a $1\frac{1}{2}$ -inch circle at 30 yards, we may expect our shots to be as much as 10 inches apart at 200 yards.

Suppose, then, that after setting our sights at what we believe to be the correct elevation—the wind is taken as being nil—we carefully fire the sighting shot. We score an inner about 2 inches from the bull line at 12 o'clock. Now this shot is not far from the bull ; it is 2 inches from the edge and $4\frac{1}{2}$ inches from the centre. As we only group to a 10-inch circle, we may be quite satisfied that

our shot is so near, for our group, if placed on the centre of the target, is larger than this.

But which shot of our group is this? It may be the dead centre one or it may be anywhere in the group, including the very edge. That is, the next shot may be

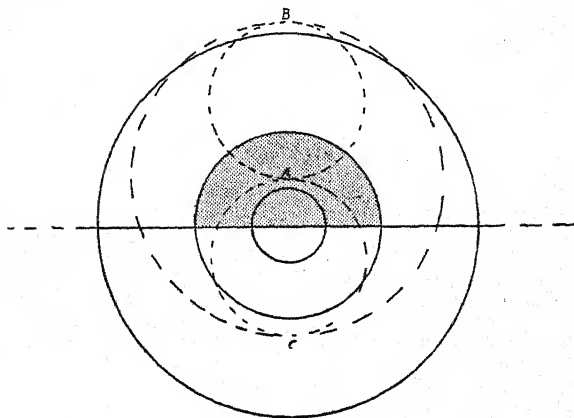


FIG. 1.

10 inches away high at 12 o'clock, or 10 inches away low at 6 o'clock.

In the diagram (Fig. 1) the two points *B* and *C* show two extreme positions which the next shot may occupy. In fact, it may be anywhere within the big circle of 10 inches radius about the point *A*, for all we know.

We are in a dilemma, for if we leave the sights alone, the next shot may be an outer in position *B*, or it may be in the magpie ring in position *C*. If we lower our sight elevation, taking it that *A* was low in the group when it was really high, the next shot may be as low as the outer ring at 6 o'clock.

In other words, when we have so wide a group and are not sure of our sights, it is useless attempting to move on the one shot.

In the Ashburton Shield competition only one sighter per range is allowed. Fortunately, most marksmen in for this competition group to a closer circle than 10 inches and, in addition, have practised before on the same range and know what their elevation ought to be.

This is the only criticism I have of this otherwise excellent competition, for if the only sighter is well away from the bull, the first shot to count may prove a very poor scoring shot with which to start the shoot. This also shows the extreme importance of making sure that your rifle is really properly dried out. A spot of oil left in the bore or a drop of rain will produce a very hectic shot, and should the firer not recognize the cause of the misplaced shot and move his sights to correct, the shoot is already half ruined.

The beginner should always be given two sighters, so that he can form some idea as to where his group is placed on the target. His aim is to find the mean point of impact or, to put it simply, the central point of his group.

If he is allowed two sighting shots, and both are good ones, he need not be at all put out if they are some distance apart; in fact, if they are 8 inches apart—a wide inner at eight followed by a magpie at six (see

Fig. 2)—he should be well satisfied, for these will be two wide shots in his 10-inch group and the mean point of impact is likely to be between them. He has now some guidance for changing his sights. He joins these two points *A* and *B* in his score-book diagram and takes *C*,

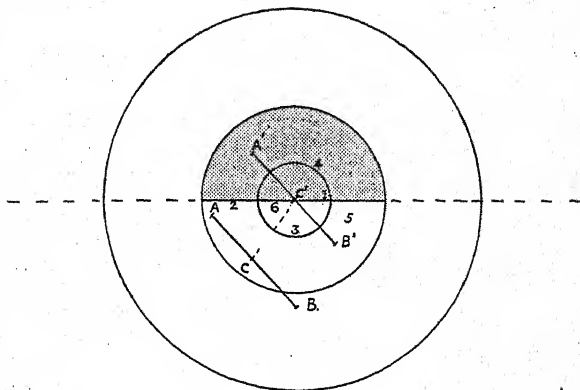


FIG. 2.

the middle point of *A B*. He asks himself what change will take *C* to the centre of the bull. *C* is about 5 inches below the centre line of the bull and about $2\frac{1}{2}$ inches to the left. He therefore puts his elevation up 50 yards and puts one click (about 2 inches) on the wind-gauge. This should bring *C* near the centre of the bull. He makes these changes on his sights and notes them down

in his score-book. $A' B'$ are the positions of A and B if they had been fired with the new sighting. No. 1, the first shot to count, is a bull at 2 o'clock. This is most satisfactory and well within 5 inches of C' the probable centre of the group. No. 2, an inner at 9 o'clock, endorses the impression that some point about C' is the mean point of impact. He now continues to shoot with more confidence, keeping the impression that C' is the centre of his group, until a tendency for the shots to go more to one side of C' than the other, gives him reason to move the group over a shade.

Of course, any shot that is known to be a wild one must be completely ignored as a guide to obtaining the correct sighting. One should thus nominate a *bad* shot as high, left, low or right, before the target is examined and its actual position disclosed.

It will be seen that the wider two *good* sighting shots are within the group, the easier it will be to estimate the mean point of impact with but few shots. If the two sighting shots A and B are close together and away from the bull, as in Fig. 3, say at 5 o'clock, all that one can do is take it that the centre of the group is between these two points and change as before, in order to be nearer to the five ring. But we know we do not shoot to a group as small as this, so we must not be surprised if the next shot is well out in the opposite direction. It is wise, if this happens, to plot this third shot on the score-book as it would have been if one had not made the change in sights; then from the three shots, two of them now fairly wide apart, we can get some idea as to where the centre of the original group really was and move the sights accordingly. If one does not do this, one is likely to fall into the mistake of "error chasing."

Thus 1' in Fig. 3 shows the position of the first shot to count if we had not changed our sights on the position of the two sighters *A* and *B*. This is really quite a satisfactory shot when thus plotted, because *A*, *B* and 1' do give us a fair idea as to where the group centre is—a point in all probability within the bull itself—*C*.

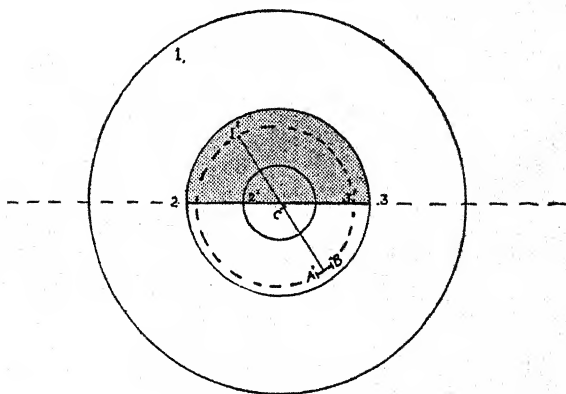


FIG. 3.

If our sights are left at the original elevation and centering, we may expect to be in or around the bull with the remaining six rounds.

Let us now see what is meant by "chasing errors." After shooting *A* and *B* close together, I change my sights as already suggested and get a bad magpie at 11 o'clock (No. 1). I had not nominated it as a bad shot when I

fired it, but I now say that as *A* and *B* were good shots, No. 1 must have been a bad one. I decide to leave the sights as they are. The next shot, No. 2, is still left in the magpie, though its elevation is correct. There are two shots out left, so I now turn the wind-gauge over two clicks to bring the shot over to the right, and am rewarded with a magpie right! Three magpies running to count. I probably get flustered and change the wind-gauge back again; in fact, if I lose my head, the last few rounds may even arrive in the outer ring. I am convinced there is something wrong with the rifle. I know my shooting was all right.

If I really want to know what has happened, all I have to do is to plot those first few shots as they would have been if there had been no change of sights. I calculate their positions, plot them, and find that my score would have been many points better if I had left my sights severely alone. This is a simple and rather obvious case of "error chasing"; but when the matter becomes complicated, as it probably will at 500 yards, by a wind to be calculated, the error chasing—especially in a lateral direction—becomes much worse.

But to return to the one sighter that is allowed for the Ashburton. We can only use the previous method for fixing the centre of the group by taking the sighter together with the first shot to count. If the sighting shot is near the bull we make no change until we can form some idea as to which shot in the group it was. If it is more than the diameter of our grouping capability from the centre of the bull, and was a good shot, we must of course make a change immediately, mark the position of the shot as it would have been with the new sighting, and proceed as before.

In the Gale & Polden competition, those schools which do not normally practise at Bisley, have an opportunity of finding out what their elevation is on a range that is strange to them. There is usually a difference, due partly to climatic conditions, partly to a new vintage ammunition, and not a little to the very different appearance of the aiming mark, which is on a much lighter coloured target than those used on provincial ranges. In any case the firer will start his Ashburton shoot with an elevation which should not be more than two or three inches out.

After one or two afternoons on the range one should not only know what elevation is likely to be the correct one, but will learn something of the habits of the rifle. Some rifles as they become warmed up begin to fire a little lower towards the end of the shoot. The firer knows this from experience learnt in the past, and when the third or fourth round is dangerously low in the bull, realizes what the rifle is doing and adds 25 yards to his elevation.

I looked recently through the score-book of one member of the School VIII and noticed that for five consecutive matches he started with 300 yards elevation for 200 yards range. In every case the sighter was either a high inner or magpie towards 12 o'clock. The first round to count was always fired with 275 yards elevation. By the third or fourth round he was at the bottom of the bull, and for the remainder of the shoot he was back to 300 yards again. Apparently each time he started at 200 yards he looked back to see how he had finished at 200 yards the last time. Although this had happened four times, he did not seem to have realized that his rifle dropped very slightly during a shoot, and

that, whereas 300 yards was certainly the elevation he needed at the end of a shoot, he should start with 275 yards.

With a knowledge of what the sights have been for previous days, it should not then be such a severe handicap to be allowed only one sighter, especially if our rifle fires to quite a small group. We should be sure of at least an inner for the first shot to count.

It would be extremely interesting to take part in a competition where no sighting shots at all were allowed. There is much to be said for such conditions, for there are no sighters on active service! If one is to score with one's first shot, one must make no mistakes in either elevation or judging the wind; this lack of skill in these matters will be heavily penalised. The one drawback to such a shoot is that strangers to a range would be greatly handicapped by ignorance of local variation in elevation due to slope, etc.

Finally, for further information about the use of sighters and deliberate shooting with open sights in general, I can do no better than recommend the perusal of the relevant sections of Captain J. A. Barlow's excellent book, "The Elements of Rifle Shooting." This author must command the greatest respect, for he has evidently studied every aspect of the subject and can speak with all the experience of personal success.

3. Making a Score.

From 1934 to 1935 the Bisley bullseye at all the short ranges was increased, and all scores rose accordingly. In the Newspaper competitions, where packed rifles and aperture sights are allowed, such an embarrassing crop of possibles was scored that tie-shooting for as many as

fifty competitors had to be arranged. In the same years the Ashburton scores rose correspondingly, and a number of team scores of over 500 were put up in practice matches and the Sussex Public Schools Meeting. One was disappointed if one did not produce at least 30 points a range on a normal day. Because this increased bull was too big for the expert with his packed rifle and aperture sights, the bull was reduced to its present dimensions in 1936; this had the effect of reducing the number of possibles by the experts. But let us consider what effect this has had on the service-rifle marksman who uses an unpacked rack rifle.

In the first place very few rack rifles group to the 5-inch 200 yards range bull. The best ones group to 6 inches (the size of the 1934 bull at 200 yards), and 7 or 8 inches is the average. With the larger bull the marksman who was shooting well and grouping to 7 inches was sure to put four or five in the bull ring, but with the present 5-inch circle it is possible to shoot extremely well and score only 28 for a seven-rounds shoot—seven inners, all well within the inner ring. Of course, in such a case it is extremely bad luck that one or two are not in the bull, but there it is.

When the bull is so small compared with the rifle's grouping powers, it is most important to realize that the close inner is a good shot. If one starts to change the sights the result will probably be mere error chasing and more inners.

It is well to have a score below which one should never go. With the present dimensions and open sights, I fix par at 28 out of 35. I expect an inner for each individual shot, and am thankful for every bull I get. As a result one very rarely gets under 30 points a range.

The sooner the members of the Ashburton team realize that they must shoot to a close inner, the better the team score will be. The high score of 68 or 69 out of 70, which one does meet from time to time, is excellent shooting combined with an element of luck. Such scores do not win the Ashburton. The winning team is rather the one whose last man scores at least inners throughout his shoot—and hopes for a bull or two to make it a 60. I have heard it said—and there is much truth in the saying—that the Ashburton is lost by the magpies at 200 yards.

To the service-rifle novice, straight from the miniature range, the scoring will seem very paltry ; but remember that, whereas in miniature you count the points you drop, with the service rifle and open sights, it is the score you build up.

So to sum up. Avoid the magpie, shoot to a close inner, and hope for a bull.

4. Elevation and Changing Light.

There is no great difficulty experienced in shooting on a dull day, after shooting on a bright one. My experience is that the bull is more clearly defined at 200 yards on a dull day, but rather less clear at 500 yards, than on a bright day. But this does not matter very much, for it was decided in the section dealing with the sights and aim of the .22 S.M.L.E. that all that is necessary is to get the same picture for every shot. On the firing point the marksman looks over his sights and decides that the best picture he can get behind his sights for that particular day, and does his best to retain it right through the shoot. There will, however, be one direct consequence of seeing a different picture on a dull day, and that is that you will probably need a different

elevation. Thus if the sighting shot is a high inner at 12 o'clock, you will change your elevation without hesitation, knowing that this is not just the high shot of your group, but is due to taking a different aim.

In the miniature section I dealt fully with the fact that the object to focus at the moment of shooting is the foresight. Actually, as the target is only 25 yards away on the miniature range, it is not particularly difficult to see both foresight and aiming mark quite clearly defined at the moment the shot is released; but in view of the open range, it is wise to drill oneself to concentrate on the correct object—*i.e.*, the foresight.

At 200 yards, again, the range is not very great, and I must say that although I bear in mind that the foresight is the object I must focus clearly as I squeeze the trigger, I experience no difficulty in seeing the black aiming mark quite clearly defined. An explanation of this is given by Captain E. H. Robinson in the *N.R.A. Journal* of October, 1930:—

“Young eyes can shift their focus rapidly, and many a youngster shoots naturally well, without thought, because he can see both foresight and mark well defined, with only an extremely small interval of time occupied in focusing one and the other. The time interval is so small that the effect is almost as though he was achieving the impossible and defining both foresight and mark at the selfsame instant.”

For the young marksman with good sight the difficulty of seeing the aiming mark clearly as the foresight is focused becomes a little more evident at 500 yards.

We have already seen that when the foresight is applied to the mark, a thin space should be left between the top of the foresight and the base line of the tin hat.

If the sight touches this base line there is a tendency to lose the foresight in the black half circle.

But it is this thin line of "white" between sight and mark which causes us to shoot high or low with changing light. To see the same picture over our sights, we must be satisfied that there is the same width of white every time we fire. Now when the sun ceases to shine directly on the target, the aiming mark is much more clearly defined and we tend to hold our foresight much closer to it—result, a high shot. When the target is very bright with reflected light from the sun, the aiming mark tends to blur and meet the sight; the foresight is then placed some inches lower down on the target in order that the eye may see the thin strip of white between sight and mark again.

Hence the slogan which you will do well to remember—Light up, sight up; light down, sight down.

Most trying conditions are produced when on a bright summer day, small clouds are scurrying across the sky, making quick changes in the light. On such a day do not be caught in the aim during such a change, or you are almost certain to forfeit a point. If you have learnt to fire quickly, as I have already recommended, you are less likely to be caught this way. Alternatively, if the light changes are frequent, endeavour to shoot always in the same light—either bright sun, or cloud.

The biggest elevation errors will be seen when the firer dwells on the aim. As I have said before, the first picture seen is the clearest and best. On a bright day, the picture seen by the eye when it is fatigued by striving to focus the foresight clearly and see a clear target behind, is likely to be far from the correct aim desired. How often has one held on those extra few seconds in an

effort to get an even clearer picture, and have been rewarded by a magpie at 6 o'clock! The moral is, never let off the round when vision has become blurred or holding has become a strain. Come down from the aim, unload the round, rest the eyes by looking at something quite close—the grass on the firing point or your score-book—load again, check the wind allowance, etc., and start completely afresh.

5. The Effect of Wind.

The Wind-gauge.

In public school rifle matches the use of the wind-gauge is permitted. This consists of a milled screw to the right of the backsight, so constructed that when it is rotated it clicks four times to a complete revolution. There is a zero line on the backsight and of six clicks each on the leaf. One click moves the sight over about one minute of angle, that is 1 inch per 100 yards range.

Great care must be exercised over the way sights are moved, as it is the reverse of the aperture sights of both .22 target rifle and the aperture sight which can be attached to the S.M.L.E.

The principle for all sights is to move the backsight into the wind. To make allowance for a left wind, move the wind-gauge screw away from you (clockwise), similarly, to move to the right, move it towards you (anti-clockwise).

When the rifle was first issued to you it should have been zeroed for wind. However, it may not stay zero very long, and may have as its true zero one left or two and a half right. As long as this is known by the weapon's owner there is no need to worry, but it is

simpler to have the foresight moved over so that one does not have to add or subtract every time the true wind allowance is called by the team coach.

The effect of wind is felt but little at 200 yards, and very rarely have I known an allowance of more than one click having to be made. For moving the centering of your group by means of the wind-gauge a rough estimate of the number of clicks to move can be obtained directly from your score-book, which is usually gridded with vertical lines, one click apart.

Wind Judging.

The wind, especially at 500 yards, seems to be the bogey of school shooting. I think more points are thrown away and more scores ruined because of the firer's disquietitude of mind which goads him into imagining changes of strength and direction and causes him to make unnecessary wind-gauge alterations, than there are through changes of light. The firer admits his error when a shot strikes high or low, but should it go to left or right he is convinced that he has been blown or the wind has dropped. (The next time your shot is to the left or right and you think you have been blown, look through your binoculars at all the other targets. You may take it that if you have been caught by a change in the wind, so will several others. If the spotting discs on the other targets do not endorse your opinion, you may be sure that it is a faulty shot, and make no change.)

If one compares one's diagram at 200 yards with that at 500 yards, it will be noticed that there are nearly as many shots at fault laterally at the shorter range as there are at the longer. Now as a steady breeze would have to produce a stormy gust to carry a round so far

over, one may take it that the wind is not to blame, nor is it guilty of a large proportion of the lateral inners and magpies at 500 yards.

It is very easy to develop an inferiority complex at 500 yards through being afraid of the wind. I have fired at 600 yards with a complete tyro who has beaten me on the total. I was expecting to see changes of wind and imagined them if they were not visible. But my tyro friend had no such troubles and proceeded to score a good 33 compared with my 31. I gave him the correct windage for his sighter, and as he was scoring bulls he very wisely left his sights alone.

My advice, therefore, is do not worry overmuch about it once you have gauged its strength. If you keep awake you will notice the major changes. Of course, you will be caught out occasionally and learn by your mistakes, but that happens to us all.

Let us now see how we are going to estimate the wind's strength.

We regard the range as a large clock-face, on which the target is 12 o'clock and the firing point 6 o'clock. A wind straight across the range is either a 9 or a 3 o'clock wind, and that from behind you is a 6 o'clock wind.

We will suppose a moderate wind is blowing across the range from 9 o'clock when we are firing at 500 yards, and causes the shot to strike the target one foot to the right of the centre of the bull; then, if the wind doubles in strength we shall expect our shot to be two feet to the right. In other words, the deflection of the bullet due to a cross-wind will be proportionate to the strength of the wind.

If the wind is from 6 or 12 o'clock we do not expect any lateral displacement, and there is none. But obviously, if the wind is not blowing straight across the range, but is coming obliquely from between 7 and 8 o'clock, we should not expect the bullet to be deflected as much as if it were blowing from 9 o'clock.

Thus the allowance we are to make will depend on three factors :—

1. The range or distance from the target.
2. The strength of the wind.
3. The direction of the wind.

We made an estimate for our sighting shot and perhaps score a bull ; but we must not rely on the wind being exactly the same for the remaining seven rounds. We must keep an eye on the flags and other wind indicators to spot any considerable change should it occur. The following rule is a good one :—

When the wind is straight across the range, watch the strength carefully, but when the wind is oblique or down the range, concentrate on direction.

Changes do take place in both strength and direction at one and the same time, so we must keep on the qui vive.

The most unpleasant wind of all is the " fish-tail." This blows straight up or down the range, but very unsteadily ; at one moment it blows from 7 o'clock and we make a wind-gauge allowance, but by the time we let the round go it has veered to 5 o'clock and our shot is out left. Such a wind is very difficult to gauge. Fortunately at 200 yards it can be ignored on most days,

but at 500 it may make havoc of a shoot, stringing the shot across the target from 9 o'clock to 3 o'clock.

I am not sure that the Army method of aiming off the bull is not the best way of combating this. With the wind-gauge at zero one can aim over left or right with the minimum of delay, and get the shot off before the wind has veered again. (The only difficulty is that one tends to lose elevation unless one has practised aiming off the bull.) An alternative is to set the sights for either 7 or 5 o'clock and try always to shoot when the wind is definitely from that direction. In a coached shoot the captain or some other member of the team can watch it for you and call a propitious moment.

There are two aids to judging the strength and direction of the wind, the flag or pennon and mirage.

(a) **The Flag.**—At Bisley, and on most ranges, flags or pennons are flown at different points along the range from butt to firing point. The strength of the wind will be shown by the way the flag waves in the breeze ; it may hang lifeless round the pole, flap lazily against it, or try to tear itself away from its moorings. Direction is easily ascertained from these, but the size and shape of the flag sometimes make it difficult to make an accurate estimate of strength. In addition, after heavy rain, the weight of the flag is nearly doubled and it registers only about half the wind that is really there, and as it dries gives the impression that the wind is increasing. The fact that the flag-pole is much higher than the highest point in the bullet's trajectory, means it may give an exaggerated idea of the strength of the wind near the surface of the ground. However, except when there is sun and mirage, the flag is the only reliable guide as to strength and direction.

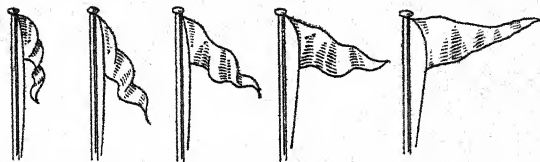
At Bisley there are rows of flags on almost every range, some near the firing point, others near the butt. The question arises, which of all these flags should I watch. Shall I watch all of them, or some particular one? I suggest you concentrate on two. First, look round when you get onto the firing point and find a flag which is blowing directly towards you; this will give you the wind's direction, and any change in direction will immediately become evident by the flag blowing slightly to left or right. Secondly, watch the firing point flag which is nearest to you, preferably one that is slightly up wind.

A mistake of the beginner is to concentrate on the butt flag, on the principle that this shows what wind is blowing the bullet when it is comparatively spent. It has been proved conclusively, however, that the wind which blows upon it as it leaves the muzzle continues to affect it throughout its flight.* Thus concentrate on the flag that is near the firing point.

There are lesser indications as to wind which may help you when the flags are of no assistance and there is no mirage. If the stop-butt is dry, the dust will rise after each round and will drift down wind. Secondly, you are as a rule shooting in pairs, and one can help another. But only move on your partner's shot if he is shooting well and nominates his last shot as a good one.

Messrs. Parker-Hale, of Birmingham, in their Public School Score-book, show an ingenious and simple system of reckoning the wind allowance :—

* See "Which is the Master Flag?" by Major J. H. Hardcastle, *N.R.A. Journal*, November, 1924 for mathematical proof; Mr. G. R. King, March, 1932, for a simple explanation.



4 M.P.H. 8 M.P.H. 12 M.P.H. 16 M.P.H. 20 M.P.H.
 GENTLE. MODERATE. FRESH: STRONG. VERY STRONG.

THE PARKER-HALE WIND ALLOWANCE RECKONER.

FORCE FACTORS.

A gentle wind is denoted by the factor	...	1
A moderate wind is denoted by the factor	...	2
A fresh wind is denoted by the factor	...	3
A strong wind is denoted by the factor	...	4
A very strong wind is denoted by the factor	...	5

DIRECTION FACTORS.

Wind from 1, 5, 7 and 11 o'clock are denoted by the factor	...	...	...	2
Wind from 2, 4, 8 and 10 o'clock are denoted by the factor	...	...	...	3
Wind from 3 and 9 o'clock are denoted by the factor	...	...	...	4

RANGE FACTORS.

200 yards range is denoted by the factor	...	2
300 yards range	" " "	3
400 yards range	" " "	4
500 yards range	" " "	5
600 yards range	" " "	6

To obtain **wind allowance** (in minutes of angle), multiply the force factor by the direction factor, then by the range factor, and divide the result by ten.

EXAMPLE.

<i>Force.</i>		<i>Direction.</i>		<i>Range.</i>	
Moderate.		From 8 o'clock.		500 yards.	
2	×	3	×	5	= $\frac{30}{10}$ = 3 minutes
		10		10	

left of zero line.

Thus, wind allowance (in minutes) equals :—

$$\frac{(\text{Force factor}) \times (\text{Direction factor}) \times (\text{Range factor})}{10}$$

As 1 minute of angle is roughly one click on the wind-gauge, in the above example we should move the wind-gauge three clicks to the left (clockwise).

(b) **Mirage.**—On a hot sunny day, when there is little wind blowing, the edge of the target seems to be running like a stream as waves of hot air drift across it. If one “fogs” the telescope slightly by putting it a little out of focus these air waves become more in evidence. On a day when the flags hang limply or tend to blow in different directions with uncertain air currents that are crossing the range, reading the mirage is more reliable as a wind guide than the flags. The ripple of the mirage appearing to flow to the left indicates a right wind and *vice versa*; when the mirage flows neither to right nor left, but “boils,” the wind is at zero.

Of course there is one obvious weakness in reading the mirage on the target, and that is that one is gauging

the wind at the target, when the muzzle end of the range is of greater importance. One can sight the telescope on to something reasonably near one, but this causes much delay.

When a breeze gets up the "waves" of the mirage flow more rapidly and eventually disappear. At this stage the flags will have begun to move, and these can be read instead.

6. Firing in the Rain.

This is a most unpleasant business, but it has to be done if the range officer considers it possible to see the target from the firing point. One must not let the fact that one is feeling miserable with rain penetrating one's clothing and dripping from cap down the back of the neck, put one off one's shoot.

If you are to be an expert marksman you must learn to tackle every variety of weather condition from blazing heat and intense mirage to a soaking downpour.

Let us first of all study the effect of rainy conditions on elevation. Contrary to what you may expect, a rainy atmosphere makes the bullet strike high on the target. The why and wherefore of this cannot be explained here, but be prepared to come down in elevation when rain begins to fall, and remember that the wet flag is misleading as to the strength of the wind.

We can easily allow for the effect of a moist or rainy atmosphere on the bullet, but the wet rifle is a greater problem.

If either breech or ammunition gets wet, a most erratic high shot will result, and with rain falling steadily it is far from easy to keep either of these dry.

I have recommended the use of the canvas rifle case,

and on a wet day you will be glad of it when you can take out a dry rifle when your turn comes to shoot. Ammunition should be kept in your shooting case if you have one, if not in your tunic pocket. When you load, draw the rifle back until the breech is well under you and tilt it well over to the right before you open the bolt. Take the round out of your pocket and put it straight into the chamber as quickly as you can and close the bolt. When you have fired a round, eject the case by opening and closing the bolt again in one motion as in rapid firing. (N.B.—The N.R.A. ruling does not allow the use of the magazine in deliberate competitions.)

Some schools wear waterproof capes instead of great-coats and these are a great advantage in the rain, for re-loading can be done in comparative dryness beneath them.

If you have to wear glasses you will be at a great disadvantage; there is nothing much you can do to keep them dry.

But, above all, remember that ammunition and breech must be kept dry at all costs. A wet round cost my school the Ashburton Shield when they tied on points with Brighton College in 1936, the wettest Ashburton Day for many years.

As soon as possible after the shoot give the rifle a thorough drying. Nothing causes the wood to warp so much as a wetting. Metal and woodwork both need immediate attention.

7. The Score-Book.

Most cadets who fire on the open range possess score-books. Many different varieties are on the market, but two are specially made for public schools by two

reputable Birmingham firms—A. J. Parker and Messrs. Parker-Hale.

A good score-book will have :

1. Space for details of match, date, weather, light, etc.
2. A tabulated form for values of shots, together with elevation and wind allowance used.
3. A separate diagram each for 200 and 500 yards.
4. A grid system for simplifying alterations in sights.
5. Space for comments on the shoot.

It is not a question of does one keep a score-book but rather of *how* one keeps it. A page which has nothing but a series of bulls and inners marked on it may be satisfactory from the point of view of score, but when one turns back to it some weeks later, it has no particular value or interest.

The book should give a true and complete record of the match.

1. This is filled in before one begins to shoot—*i.e.*, the name of the practice or match, where it is fired, at what time and under what conditions of light, etc.

One of the unfortunate disasters that upset a marksman and can ruin both his and the team's score is a shot on the wrong target. It is a useful reminder to draw the number of the target at 12 or 6 o'clock on the diagram ; this gets one into the habit of checking the target number for every shot, a necessary precaution when shooting on the Century Range at Bisley.

The note on light and wind is of importance, as it is the key to elevation and windage for that particular day.

2. The elevation and wind-gauge allowance are entered shot by shot. These give the corrections which are made and will enable the firer to reconstruct his group after the shoot. Opposite the score column should be entered any nominated inaccurate shots as—4 H(igh), R(ight).

Thus one can look back in the score-book to see the elevation usually used at, say, 200 yards on a dull wet day.

3. On the diagram of the target it makes little difference whether the positions of the shots are marked by the small index figure of the shot's number or by the ray method. The latter is perhaps rather more convenient if one is shooting very close to the bull. But do be honest in entering the shot's position. It certainly looks so much better if a bull is marked in the dead centre when it was really half way between the centre and 9 o'clock, but this is only misleading when we endeavour to ascertain how close the rifle has been grouping. If a shot in the magpie is a wide magpie, and nearly in the outer ring, let it be marked there, and not so close to the inner that it is worth at least $3\frac{1}{2}$. Incorrectly marked shots tend to make one underestimate the change that should be made in the sights. If a shot is to be marked on the diagram accurately a telescopic or good pair of binoculars must be used to fix the exact position of the spotting-disc.

4. The grid system is not absolutely necessary, but both score-books I have mentioned give the vertical lines of the grid one click of the wind-gauge apart; the horizontal lines are either 25 yards elevation or one minute of angle apart. Thus, with a minimum of labour

one can work out the amount of correction to make on the backsight and wind-gauge.

5. The space left for remarks should be filled in after the shoot when one has had time to study it. It is a space not so much for expressing complacent satisfaction at a string of bulls, but rather the lesson which may be learnt from the faults committed. Most of us make mistakes, but we are fools if we go on repeating them. A keen marksman studies the back pages of his score-book carefully and, if the record is a complete one, can note the warnings of past disasters.

8. Cleaning and Care of Arms.

Cleaning Before Firing.

Remove bolt and magazine and place rifle in vice or cleaning rack. Wrap a piece of "four-by-two" on a ramrod and dry out every trace of oil from the bore. Should any be left, that most important shot, the sighter, may be very erratic indeed, and unless the firer realizes what has happened the whole shoot may be ruined.

Dry the chamber with a piece of flannelette on the breechstick, dry the face of the bolt and magazine platform. The bolt itself should be slightly oiled to ensure easy working.

The foresight and backsight should be cleaned with a piece of dry rag and then blackened over by means of a candle flame or by painting on a thin coating of dead black. A shiny or oily sight will have poor definition on a bright or sunny day and bad elevation will result.

Finally, test all screws with a screwdriver, especially the trigger-guard and upper and lower band screws.

Cleaning After Firing.

The best method of keeping the barrel clean and in good condition is to remove all fouling as soon as possible after firing. Fouling left in the barrel and exposed to moist air hardens, is more difficult to remove, and if left for any length of time, forms rust.

Teams frequently have to travel long distances to the range and, after firing, there are few facilities for proper cleaning. In such circumstances the barrel should be well oiled with pull-through or ramrod and oily flannelette, to prevent exposure to the air. Thick G.S. oil or Young's Cleaner are most suitable. (I always take a tin of pieces of four-by-two soaked in Young's Cleaner with me on to the range and use three or four pieces before putting the rifle into its case.)

A thorough cleaning should be carried out when the team returns, and the captain should satisfy himself that every rifle has been properly attended to before it is returned to the rack.

I suggest the following procedure, though doubtless there are other methods which are equally successful :—

1. Remove the bolt and magazine.
2. Pour about six pints of boiling water through the barrel from breach to muzzle, using a funnel. If no hot water is available cold will do.* Another alternative is an emulsion of Young's Cleaner and water rubbed up and down the bore on a jag.

(The reason for using water is that the cap of the cartridge contains the salt potassium chlorate, and this becomes potassium chloride when the round is fired. Potassium chloride is extremely soluble in water and is

* If bore has been oiled previously the oil should be dried out before water is applied; this is particularly necessary if cold water is used.

thus removed. If left in the bore it absorbs moisture from the air and eventually causes rust.)

3. Dry the bore thoroughly and, if hot water has been used, allow to cool.

4. Remove the fouling from the bore. I prefer to use a series of patches soaked in Young's Cleaner. Continue this process until you are satisfied that all fouling has been removed.

5. Finally top up with G.S. oil as a preservative. This is done most easily by soaking a half-width piece of flannelette in thick G.S. oil and, after wrapping it lightly on the ramrod jag, pass it several times up and down the bore.

6. Clean and replace the magazine, clean and oil the face of the bolt, check the number and replace.

7. Rub a piece of oily rag over all the outside surface.

Do not plug the muzzle with a piece of flannelette, even if it is oily. The flannelette tends to absorb moisture, and if the rifle is left a long time a ring of rust which collects nickel will result. In any case this is forbidden by regulations.

General Care of Rifles.

On all occasions treat the rifle with the greatest respect. If possible keep it in a cloth or leather case, obtainable for a few shillings from any large gunsmith's. This protects it from rain, from dust and grit, and may prevent it being knocked or damaged in the train or bus to and from the range. Tin foresight and back-sight protectors may also be added for a few pence.

Do not leave the rifle on its side in the sun. Excessive heat causes the woodwork to warp, and this may cause the fore-end to bear on the barrel.

If you have to shoot in the rain, thoroughly dry both metal and woodwork as soon as you possibly can.

Metallic Fouling.

If a rifle barrel has rusted at all, been scratched or otherwise roughened, when the bullet is forced through the bore some of the soft nickel case is left on the rough parts of the lands and tends to increase with each successive shot. This causes erratic shooting of the rifle, especially, as is frequently the case, when nickel has formed at the muzzle and under the foresight block.

My experience is that, given a good barrel in the first place, there is little to worry about as long as careful cleaning is carried out after each shoot. Every armoury should have a set of gauges, ranging from .303 to .30375 or .304. If the firer knows which is the largest gauge his barrel will take, he can easily detect the presence of nickel after firing and cleaning, as the gauge will refuse to pass through the bore. Nickel thus discovered is best removed by the contingent R.S.M., but the firer can use a quite harmless remedy. This is Cunirid, a paste manufactured by the Birmingham Small Arms Company. A little of this used on a piece of four-by-two with a ramrod, will gradually remove the nickel without in any way harming the barrel; it also tends to polish off any roughness that may have formed.

To my mind the nickel trouble is greatly magnified to explain what was probably bad shooting. One year I wore out a new barrel, removing what was probably imaginary nickel. As long as the rifle shoots well and is properly cleaned, do not worry. Bad nickeling will soon show itself in your shooting.

When the Canadian team came to Bisley in 1911 and did so well it was noticed that they all smeared the bullet end of the round with a form of graphite grease. That the shooting was in no way impaired was shown by their excellent shooting, and those who use what is now known as "never nickel," will tell you that it acts as a lubricant and greatly minimises metallic fouling.

CHAPTER VII.

COMPETITIONS ON THE OPEN RANGE.

One of the main aims of the season's open range training is to bring the team to "concert pitch" for the Ashburton Shield. This idea of training up to a peak point of form is very difficult to judge, but it is most important that the VIII should not be stale before its biggest match.

The more matches, especially shoulder-to-shoulder ones, that can be fired in the first half of the season the better, so that those lacking experience can grow accustomed to match conditions; but for the last fortnight before the Bisley Meeting only practice shoots should be fired, and not too many of these.

Although the big event of the year is undoubtedly the Ashburton Shield competition, it is a great mistake to make this the only shooting event on the open range. In the middle of June the Sussex County Rifle Association arranges an open match for public schools at Bisley, and some thirty to thirty-five schools compete annually. Of recent years the Midland Public Schools' Ashburton Trial Match, under the ægis of Lieut. E. J. Cown of the Midland Rifle Association, has been competed for at Kingsbury by most Midland schools. In addition, there is the Scottish Schools Match, apart from a number of local meetings organized by county associations. If the geographical position of the school permits, at least two big matches can thus be arranged.

Most school fixture lists include a vast number of postal matches on their practice shoots. Though these may make the practice a team event, the comparison of the actual scores has not much value as weather conditions may be very different on different days of the week at, say, Jersey and Sedbergh. Of much greater interest are shoulder-to-shoulder matches between neighbouring schools ; these give the VIII vital match experience.

Thus the VIII's programme should, like the school's cricket fixture list, consist of a number of matches leading up to the big annual event.

1. The Ashburton Shield Competition.

A full history of this competition is given in the *N.R.A. Journal* of February, 1937. It will suffice here to say that, from a competition open to only seven public schools in 1861, it has grown to be the biggest inter-public schools sporting event.

Between eighty and ninety teams compete annually at Bisley for the trophy presented by the third Baron Ashburton. In fact, apart from becoming one of the social events of the year, the Ashburton has become a very severe test of the young boy who feels that the eventual success or failure of his school's team hangs on the result of every round he fires—a stern test of nerves and control.

Good health is the first essential of every member of the team. Shooting, especially under big match conditions, takes a deal out of the firer, although he may not realize it at the time, because of the deep concentration necessary. It is therefore imperative that everyone goes to Bisley fit and keeps fit whilst he is there.

First with regard to going down to the meeting in good health. Membership of the shooting VIII often means that one is taking no part in organized school games, and it may not be difficult to get "out of sorts" through lack of exercise. The team cannot be shooting all the time, and it should be a rule that on all days that they are not on the range they should take some form of exercise—tennis, squash, gymnastics, etc. or swimming, as long as it is not before a shoot. Occasional special physical training classes are not a bad way of keeping one fit.

When the team travels to Bisley it is going to live under different conditions whilst it is in camp. The food, the chalky water, the rather enervating climate, all tend to have their effect. Scottish schools and those from the North and Midlands frequently find conditions very trying because of the heat and bright light, to which they are unaccustomed. When the Dominions send teams to compete at Bisley, they settle there some time before the Imperial Meeting, not merely to practise and study local range conditions, but also to get accustomed to the effects of the new locality on them.

If the VIII want to be at their best they must be careful of what they eat and drink. Plain good food, such as they are accustomed to, is the ideal. They should, as far as camp life will allow, live their normal life and see that nothing is allowed to upset the digestion. If the digestive system is upset the marksman will not feel really up to the mark, and probably the first outward sign of this will be the deterioration of his shooting. Normal daily habits must be regular; it is a good precaution to take some aperient every morning, whether it is really necessary or not.

The next point to be considered is shooting practice. Most schools arrange two days' practice before the Ashburton, and it is possible to get squadded range accommodation on the Gale & Polden competition, which is fired under Ashburton conditions, except that coaching is allowed.

If the VIII fire one 200 and 500 each on the Tuesday and the same on the Wednesday, it should be quite sufficient, especially as there is the Public Schools Snap-shooting and Rapid competition and the Marling to be fired on the Wednesday evening. The main object is to get acclimatised to Bisley and to obtain sufficient practice on the ranges to be sure of one's sights at 200 and 500 yards. I know it is possible to have unlimited shooting at either range during these two days, but to do so is very unwise, as it will possibly make one stale before the big match arrives. If the marksman has not learnt to shoot reasonably well before he arrives at Bisley, it is a little late to start.

If the school has been squadded for the Gale & Polden, it will be allotted one target for so many half-hours. The best way of carrying out this practice is to arrange the same pairs as are expected to fire on the Thursday, coaching being carried out by the team captain. Thus the shoot becomes an undress rehearsal. Only where something seems to have gone wrong either with the rifle or marksman should a repeat shoot be performed, and then this should be done with the coaching of the instructor. The boy who has a bad shoot at 200 yards and rushes off to shoot again, will probably do himself no good and, as likely as not, produce an even worse score than before. This will have a very bad effect on morale.

There is lots to see and lots to learn during these two days, so that the time will not hang on one's hands.

There is little advice to give about the Ashburton shoot itself, for it should be identical with all previous team practices, except that only the captain or some other member of the team is allowed to coach.

The captain and vice-captain or secretary should shoot first, so that they will be free to coach the rest of the team. (It is a mistake to spend an hour and a half glaring through a telescope at a bright target and coaching and then expect to shoot at the top of one's form oneself.)

The order of shooting needs very careful arrangement, as the scoring power should not tail off down to the last pair. The greatest strain falls on the last pair when the team is doing well or is hard-pressed by a neighbouring school. The best order is: Captain and vice, third pair, fourth pair, second pair. The last detail should consist of two sound and reliable shots who do not get flustered and always do reasonably well.

The score boards of other schools become very fascinating, especially if the team is doing well; but the best results are obtained if other schools are completely ignored until the team has finished. If a pair have finished their own shoot they can go and study other boards, but should not upset their own team by announcing either the success of others, or how well their own team is doing. This may be a counsel of perfection, but it is worth consideration.

It should be borne in mind that with the present target dimensions, a winning score is not very much

more than an average of inners ; 480, or 60 points per boy, if not the winning score, should be very highly placed. As I have said before, inners do not lose the Ashburton, but rather the magpies at 200 yards. As long as the inners are close to the bull, the firer should be well satisfied and hope that the next round will be a bull.

Lastly, a word or two on the subject of " nerves." In the first chapter of the book it was stated that the marksman who cannot learn to control himself, will fail when the big test comes along. This does not mean that even the best of us do not at one time or another feel the strain of a big match or competition. Most people do. What is of greater importance is how can one learn to overcome the awful " dithering " feeling ? To my mind the answer to the question is the word *concentration*. Every shoot should be regarded as a means of adding to one's knowledge of the sport of rifle shooting. The firer concentrates on letting each shot off in such a way that it should be in or near the bull, taking care that nothing is left undone that might better the shot. With clear mind he must study the way his group is forming and carefully calculate any change in sights that may be necessary, entering it up in the score-book. In other words, he concentrates wholeheartedly on the match in hand in a calm frame of mind. Finally, this attitude of mind must be backed by the " will to get there "—not anxiety over the score, but determination to succeed. In the Ashburton the captain or some other member of the team is responsible for watching the wind, so your mind is clear of that responsibility. All you have to do is concentrate on each shot as it is fired and study the group as it takes form in the score-book. Never let a shot go which, on its merits, is not worth five points.

2. Snapshooting and Rapid.

Conditions.

Open to one team of eight from the school contingent of each school which has entered a team for the Ashburton in the current or any preceding year.

Distance	...	200 yards.
Position	...	Prone.
No. of shots	...	Five and 2 sighters per man snapshooting, 10 per man rapid.
Targets	...	Bisley 200 yards 4-foot target.
Dress	...	Uniform, belts optional.

Special Conditions.

1. Each team will have two targets allotted to it, at which the members of the team will fire in pairs. Each pair will fire the rapid practice immediately after the snapshooting before leaving the firing point.

2. In the snapshooting practice, after all sighters are finished, the target appears five times, five seconds up and five down. At each appearance only one shot per man will be fired.

3. In the rapid practice the targets will be exposed for one minute, during which all the shots allowed must be fired.

4. In both practices magazines must be charged with five rounds only, one of which rounds must be loaded into the chamber, bolt must be closed and (i) in snapshooting the rifle may be on aim at the shoulder with the safety-catch off; (ii) in rapid firing the rifle must not be on aim or at the shoulder, and the safety-catch must be applied. The cut-off may be open. Unloaded

ammunition must be in chargers which may be on the ground.

Slings not allowed. Rifles as for Ashburton.

5. The members of the team may coach one another, but may not receive assistance from any other person.

It will be best first of all to study the mechanical training which underlies these two practices.

Since the rifle must be used without sling, except for sighters, the training received in the "Country Life" competition will be very useful, for it will at least have taught one how to hold, as the sling is not allowed at all in that competition. But it will be remembered that, because of single loading, the time element is very different. The firer must now learn to charge the magazine and to manipulate the bolt cleanly and easily.

To Charge the Magazine.

The magazine should first be tested with a finger to see that the platform spring works properly and that there is no tendency for the platform to stick. (The platform and spring must be removed from time to time and cleaned of old oil and dirt which tends to collect there.) The ordinary weapon training of loading in the prone position should then be practised with a couple of chargers of dummies.

Chargers are no longer provided with the ammunition at Bisley, and the school must take down its own. It is a good idea for each member of the team to have three or four of his own, which he should clean carefully, especially in the bottom lips where the rim of the cartridge runs; this can be done by passing clean cases or dummies through a number of times. (Easy movement

of the rounds can be assured by rubbing a little graphite grease into the lips.) If the charger is too tight, another should be taken in its place. By this means the possibility of the rounds sticking in the charger is completely removed.

Next, the rounds should be carefully arranged in the charger, either with the rim of one cartridge below the next, or with the rim of the rounds alternately over and under each other; this ensures the rounds packing cleanly into the magazine.

To charge the magazine, keep the muzzle of the rifle off the ground, the position in which it is held in weapon training. If there is an easy bolt action the bolt may slide forward and prevent the rounds being inserted into the magazine. The rifle should be tilted slightly upwards by the right hand. Although there is unlimited time in which to load for the snap and before the rapid, the magazine has to be recharged in the middle of the rapid, and recharged with as little delay as possible.

The charger is placed vertically in the charger guides, the fingers of the right hand hook under the cut-off to give leverage. Place the right thumb on the uppermost round near the charger and, with one firm sweep, press the rounds down into the magazine until the top round has engaged the lip of the magazine. If the charger is stiff and the rounds cannot be forced out, reverse the charger in the guides and try again.

Bolt Action.

Next comes training in bolt manipulation. The rifle is first prepared by cleaning all old oil and dirt from the bolt and action; the bolt and action are then oiled with

a little thin machine oil, and this is worked in by moving the bolt to and fro as in "Ease springs."

The firer then practises rapid fire, first with an empty magazine until handling of the bolt becomes easy, and then with dummies.

The bolt has first to be drawn right back so that the empty case is ejected and the face of the bolt is far enough back to engage the base of the next round in the magazine. It is then driven forward to thrust the round into the chamber, and rotated to the right. Although these are two separate motions, they must be practised until they can be carried out as one. The object of this practice is that reloading may be performed in a minimum of time, and that it may be effected in such a way that the aiming position is disturbed as little as possible. For every reload the right hand has to leave its position to work the bolt and then return to the small of the butt. The movement of the right hand has also to be quickened up so that, as it returns to the small, it pulls the rifle into the shoulder whilst the trigger finger straight away takes the first pressure.

The rifle is tilted to the right during reloading to assist bolt-work and the ejection of the old case. I find that raising the right elbow from the ground at the same time is a further help, and it will be found that no time is wasted in returning it to its position again. We have seen that the bolt must be drawn right back or a jam by the case or next round may take place, and that the whole reload should be effected as one movement. If the elbow is raised and the rifle tilted, it is easy to snatch back the bolt so that the bolt-head strikes hard against the resistance shoulder of the body of the action before the bolt is thrust forward again.

In the rapid practice at Bisley ten rounds have to be fired in one minute, and this necessitates recharging the magazine. The rounds fired must therefore be counted and the second charger inserted after No. 5. I always re-charge after No. 3, as not only is there greater peace of mind when this has been done, but it is a waste of precious seconds to try to fire with an empty chamber, apart from putting one out of one's stride.

Thus the whole loading and charging practice can be speeded up till there is plenty of time for a reasonable aim and steady second pressure. As long as the firer is worrying about whether he will get the rounds off in the time or not, he is not likely to do himself justice in the shoot. With practice the aiming also can be quickly executed. In the section on miniature rapid firing it was pointed out that the firer must be ready to let off a reasonably correct shot, and never waste time trying to get a perfect aim. Quick aim will be considerably easier if the head is kept still during the reload, with the left wrist pulling the rifle firmly into the shoulder so that the butt does not slip from its correct position. If either the butt or head is moved, precious seconds are wasted in correcting hold and position for each round.

Finally, the rifle should be gripped and pulled firmly into the shoulder by both hands, so that any tendency to pull the trigger harshly may be neutralised.

Sighting Shots.

Two sighting shots are allowed before the snap-shooting, both of them being marked by spotting discs as for deliberate shooting. The question now arises, should these be fired without sling so that conditions will

be the same as in the competition, and should they be fired quickly as in the rapid ?

I have tried firing with and without sling, in rapid time and deliberate, and have come to the conclusion that it is best to use the sling and fire two very careful sighters. From the two it should be possible to fix, roughly, the centre of the group and make any change necessary.

But it may be objected that, when one fires snap or rapid without a sling, one's elevation is completely different. This is certainly true, and the firer must discover whether his shots go high or low when he shoots rapid. This is best done by sending a second detail into the butts with score-books, and making them take down the position of the shots as they are fired, both with snap and rapid practices. In this way the marksman will find what elevation changes to make on his normal sighting. Most people tend to drop away from the aiming mark in rapid, but this is not true for all. Personally, I like to have my sighters at 12 o'clock, just in the black, and though the first shot or two may be a little high, my last six or seven rounds have fairly correct elevation.

If the sighting shots are fired without slings and at rapid pace, they are so often erratic that they are no guide at all as to the elevation for the rest of the shoot.

In the snapshooting practice the target appears for five seconds, and is down for five seconds. There is thus plenty of time for a good deliberate shot. If the firer comes up into the aim about two seconds before the target appears and takes the first pressure, there is ample time for correcting the aim and squeezing the trigger. The scoring for the snapshooting is usually

much lower than the rapid, and my impression is that this is due to most boys snatching at the trigger during the first two seconds of the exposure, instead of taking advantage of the full five seconds.

There is no need to stay in the aim. With practice two or three seconds can be spent in the " Watch your front " position.

Coaching by other members of the team is allowed, and this may be put to two uses. First a rough check on the time can be kept for the firer during the rapid ; and secondly, if a good telescope is used, the shot holes can easily be seen and the firer told to make any change in his aim that may be necessary.

Lastly, concentrate on the job in hand and try to ignore the din from other ranges. Keep an eye on the number of your own target. It is distressing to put ten rounds rapid on the wrong target, but it is quite easily done if one is not careful.

3. Fire with Movement.

Conditions for the Marling Challenge Cup.

Open to one or more teams of eight rank and file, under an under-officer or N.C.O. (who will not himself fire), from any school contingent of the Junior Division, O.T.C.

Rifles	...	As for Ashburton. Slings may not be used.
Dress ...	...	Uniform, without belt or equipment.
Position	...	Prone throughout.
Distances	...	600 to 100 yards.

Targets	...	Two 6-foot N.R.A. targets per man.
No. of shots	...	Ten per man, <i>two</i> (and <i>two</i> only) must be fired at each halt.
Timing	...	Exposure of 45 seconds with intervals of 15 seconds, to be timed at the butt.

The team will be drawn up at 600 yards. Arms will be inspected by the umpire.

Rifles will be loaded with two chargers and sights adjusted on command of the team captain, and safety-catches applied.

On the appearance of the target, which will be exposed for 45 seconds, the team will double to 500 yards and there fire *two* rounds per man. After 45 seconds the targets will be lowered 15 seconds; during this interval competitors will prepare for the next advance. On the re-appearance of the targets the team will double to 400 yards and fire *two* rounds per man—and so on *up* to 100 yards.

Safety catches *must* be applied before movement.

This is the only fire-with-movement competition for O.T.Cs. at the Bisley Meeting. Somehow it has never been vastly popular, as sixteen teams is the biggest entry there has ever been.

I cannot quite understand this, as it is both an amusing and interesting shoot. Admittedly it is heavy going for the team, but after asking several schools why they have not entered, I have come to the conclusion that it is because there is the feeling that it is too tiring a shoot for the evening before the Ashburton, especially as the team has probably just fired the snap and rapid.

I should very much like to know on what facts this opinion is based. A study of statistics for the past few years shows that many of those who enter for the Marling do well in the Ashburton the following day. I give here, for example, last year's (1936) results. Of the fourteen teams who entered for the competition, the following Ashburton positions were held by five :—

- 2nd, Denstone.
- 3rd, Glasgow Academy.
- 4th, Harrow.
- 8th, Cheltenham.
- 14th, Repton (winners).

These results contradict popular opinion as to the results of the Marling on deliberate shooting. One may also quote the truly remarkable achievement of Brighton College in 1927, when their team won the Ashburton, the snap and rapid *and* the Marling !

I should like here to recommend this competition to the sixty odd schools which at present do not enter, and I do so with the firm conviction that the effects on their Ashburton shooting will be beneficial.

I have already stressed the point that the Ashburton team must be physically fit if it is to do itself justice at Bisley. As the competition consists of a run down the range from 600 to 100 yards—admittedly at a trot rather than a sprint—the team must practise and be fit to be able to put up a good performance. Furthermore, we have seen that a team may tend to go stale before the Bisley Meeting, and towards the end of June the substitution of snap and rapid and Marling practice in place of repeated deliberate shoots, gives a very welcome variety to the team's training. In addition, the team

is an O.T.C. team, and the Marling, together with snap and rapid, gives the only "service conditions" shoots there are. The firer puts into practice what he has learnt in his weapon-training instruction.

That it tires the team before the Ashburton is, to my mind, merely an excuse. There is a night's rest before the big shoot, and with all the excitement of the hopes and fears for the next day, there is much to be said for turning in on the Wednesday night so tired that one goes to sleep at once.

I do not know if I am in any way different from others in this matter, but I have been through the ranges—200, 500 and 600 yards—five or six times in a day, and have found more often than not that my last shoot, when I have been physically tired, has been the best of the day. Of course, I am not a growing boy, but I do find that fatigue has a steadying effect on my nerves.

Some schools enter for the competition with hardly any training. This is, perhaps, better than not entering at all, but their performances can be bettered if a little trouble is taken over preliminary practices.

In the first place, the team should practise without firing. This can be done either on the range, after deliberate firing is done, or on the school's playing fields. Here it may not be possible to fit in a 600 yards run, but if a target can be put 600 yards away, then, even if one cannot run up to it because of hedges, if another target is erected at the starting point, the team can run up to, say, 300 yards and then turn about and have the second target at the correct distance for the 300 to 100 yards half of the run. In this way the team will learn to portion out the time for the running and firing.

In all fire-and-movement practices the point to watch is unsteadiness due to the physical effort of running and getting up and down from the prone position. The run should thus be rather leisurely, and when the firer has assumed the prone position there should be time for a few deep breaths to steady oneself down before the two rounds need be fired.

A common error is hurrying to get the rounds off whilst one is still breathing heavily. If the team goes through the practice a few times with an N.C.O. calling out the time, they will soon learn how many seconds they can allow for each portion of the shoot.

The first time the team fires the competition they should fire one cadet per target; those not firing should go into the butt and take down in the score-book the shots as they are fired, marking them 55, 44, etc., according to range. Only in this way can the firer check the elevation to use at each range. After a shoot or two, when the elevation of each range is known, the firer should learn these off by heart so that he can make the correct changes without hesitation when he fires the actual competition.

The wind allowances for each range should be called by the captain. He gives the wind for 500 yards and then calls the amount to be taken off for 400 and 300 yards. As it is a 6-foot target, the sights should be zero for the wind for the last two ranges. The 15 seconds allowed for sight alteration and preparing to advance at each range is ample.

When the targets are lowered for 15 seconds, the team captain calls the elevation of the next range and the wind to be taken off (if any). The team make the necessary changes, apply safety catches, and prepare to advance.

CHAPTER VIII.

FROM THE ASHBURTON TO CLUB SHOOTING.

The school shooting year terminates with the excitement of the Ashburton and the Imperial Meeting. The team return to school triumphant or disappointed. And then what? On an average four to five of the eight are leaving school at the end of July and will either be going up to the university or starting in some profession. That means between 350 and 400 from the best marksmen the schools have produced that year. Is their shooting to end at this point? Those who are really keen and have been badly bitten by the "rifle bug," may find ways and means for continuing the sport.

But for the rest the majority drop it because either they have the idea it will be much too expensive for a man starting on a rather meagre salary, or because they have no idea how to make a start.

For those proceeding to the university their course is easy, for Senior Division O.T.Cs. have very keen rifle clubs and produce a very high standard of marksmanship.

Secondly, within a year or so many will be taking commissions in the Territorial Army, which is one of the chief aims of the Junior O.T.Cs. Here they will have many excellent opportunities of continuing the sport of rifle shooting as they have learnt it—*i.e.*, with open sights. They may stimulate interest in shooting

amongst the men and may possibly represent their unit in both the Services and Imperial Meetings at Bisley. It is the duty of an officer to set an example to his men in keenness in all forms of training and, if possible, he should be able to set them a high standard of marksmanship himself, and take a keen interest in their shooting.

And thirdly, what target shooting is there for the remainder ?

For the past few years I have always made a point of supplying the names and addresses of the secretaries of rifle clubs near the district in which the boys leaving are going to live. (These can be obtained from the N.R.A. Year Book.) Several times it has been possible to introduce them to the secretary himself at Bisley. The matter has then rested with the club secretary, but a good two-thirds of the school's recent Ashburton teams are now shooting for clubs and, from all accounts, thoroughly enjoying it.

Club shooting is rather different from school shooting, due largely to the use of the aperture backsight, but if the marksman has used the .22 target rifle at school and has fired on the open range with a sling, there is not so very much to learn.

With regard to expense, I do not intend to go into details here, especially as these will vary with the distance one has to travel to the club range ; but on the whole the sport is less expensive than golf for the beginner. Most clubs have an annual subscription of about 10s., and charge from 2s. to 3s. for a three-range shoot, including ammunition. They also possess club rifles which may save the beginner having to provide his own at the start,

or if he pays his annual subscription of 5s. to the N.R.A., he can hire a rifle at the rate of 15s. a year. In addition, the War Office has of recent years greatly encouraged and stimulated rifle shooting by allowing the N.R.A. to sell the remarkably accurate Pattern '14 rifle at the astounding figure of £3. Of course a special aperture has to be provided for it, but even this can be hired from some armourers. At the time of writing the supply of Pattern '14 rifles has been discontinued, but it is to be hoped that they will again be available in due course.

Portions of the Imperial Meeting are open to all comers, the entry being divided into three classes—Expert (X), medium marksman (M) and the tyro marksman, who fires with an unpacked rack rifle (RR). For the RR class the entrance fees are very small, and for the past two years quite low scores have been in the prize list. Though one should enter the meeting for the enjoyment it entails and not merely with a view to winning prizes, it is not very difficult in one's first year to win at least one's expenses.

And then there is the most attractive of all rifle competitions—H.M. The King's Prize. It should be borne in mind that for the first two years after leaving school, past membership of a Junior Division O.T.C. counts as a qualification to shoot for this and all other competitions which are open only to past and present members of His Majesty's Forces.

One cannot finish the list of events open to the beginner without making some reference to the Veteran's Match. This competition is becoming increasingly popular, owing largely to the interest and enthusiasm of Commander Sir Lionel Fletcher. The match is open to teams of five old boys from any school which competes

for the Ashburton Shield, on condition that they have paid £15 to the N.R.A. funds to qualify. It is fired on the evening of Ashburton Day, so that old boys can come down to see their school compete during the day for the Ashburton and then shoot against the veterans of other schools in the evening. Sweep competitions are fired before the match, so that it is always possible to sight up a strange rifle beforehand. There is no limit to the number of teams that may enter, and a special section—Section B—is reserved for teams which fire with open sights. Thus, if on leaving one is unable to keep one's shooting going as a regular pastime, one can at least come down to Bisley on Ashburton Day and fire in a veterans' team. Finally, in a number of cases, the old boys of a school have formed a club of their own and arrange their own shoots, train for the Veterans' Match, and take in hand members of the VIII when they first leave school. This arrangement is easier for those schools which have large numbers of veterans in London or near Bisley, but it is the ideal. Where this is not possible, the old boys should at least appoint some marksman to be responsible for entries for the Veterans' Matches at Bisley and to see that as many as possible turn up to shoot.

Rifle shooting is a fine sport and takes a great hold on its devotees. Judging from those one meets year after year in the Imperial Meeting at Bisley, one is never too old to enjoy it.

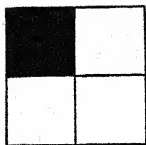
The boy who has fired well under Ashburton conditions has the makings of a good marksman and will never regret continuing with his shooting after leaving school; and once he has begun he will go on with it, for with its

ever-changing conditions there is always something new to learn.

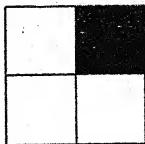
I am only too conscious of how I have but scratched the surface of the subject in these pages, and realize how much more I myself have still to learn. Yet if this small book in any way helps the beginner in his shooting, either on the miniature or open range, I feel it will have justified its publication and will enable me in some small degree to repay a modicum of the kindness and assistance I have received in my own shooting from those more experienced than myself.

Appendix.

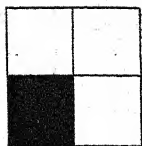
BISLEY MARKING



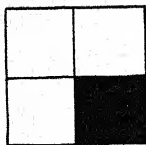
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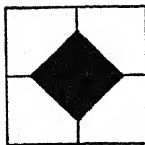
MAGPIE = 3.



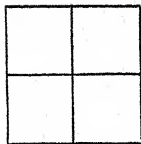
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BULL = 5.



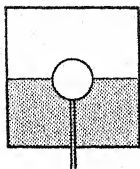
RICOCHET.



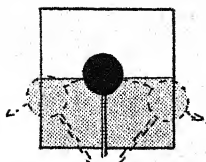
EXAMINE.

At Bisley the value of the shot is signalled on a dummy panel as above when the target is lowered.

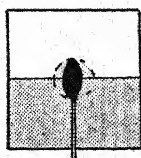
ARMY MARKING.



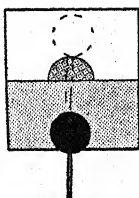
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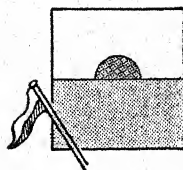
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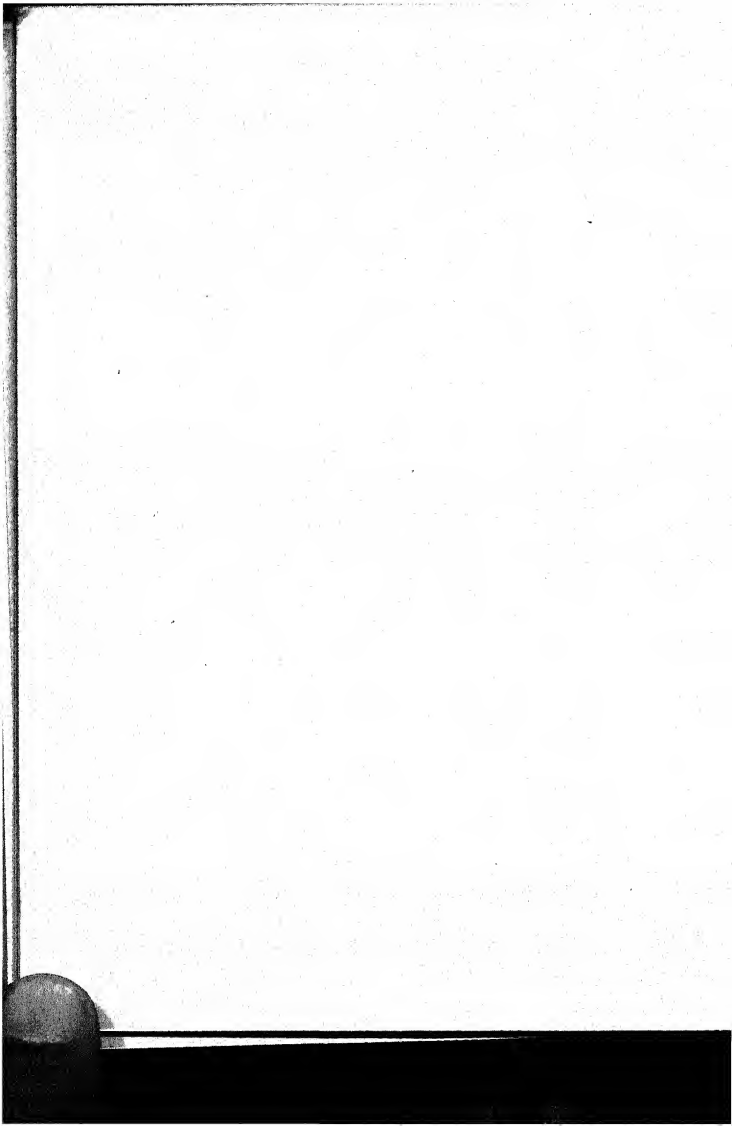
MAGPIE = 2.



OUTER = 1.



Miss = 0.



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